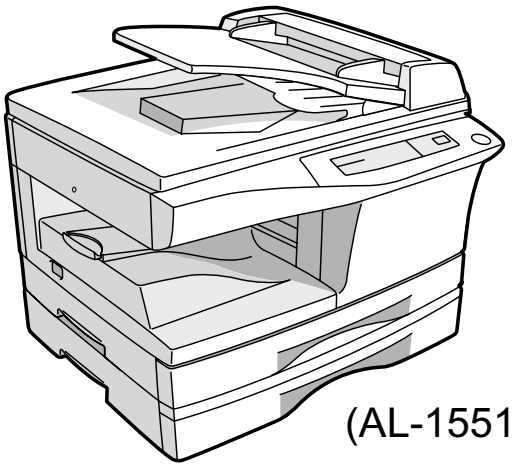
SHARP SERVICE MANUAL

CODE : 00ZAL1551/A2E



(AL-1551)

DIGITAL COPIER

AL-1043
AL-1252
AL-1452
MODEL AL-1551

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Parts marked with "⚠" are important for maintaining the safety of the machine.
Be sure to replace these parts with specified ones for maintaining the safety and performance of the machine.

SHARP CORPORATION

This document has been published to be used for after sales service only.
The contents are subject to change without notice.

CAUTION

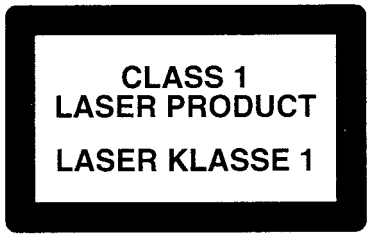
This product is a class 1 laser product that complies with 21CFR 1040.10 and 1040.11 of the CDRH standard and IEC825. This means that this machine does not produce hazardous laser radiation. The use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

This laser radiation is not a danger to the skin, but when an exact focusing of the laser beam is achieved on the eye's retina, there is the danger of spot damage to the retina.

The following cautions must be observed to avoid exposure of the laser beam to your eyes at the time of servicing.

1) When a problem in the laser optical unit has occurred, the whole optical unit must be exchanged as a unit, not as individual parts.
2) Do not look into the machine with the main switch turned on after removing the developer unit, toner cartridge, and drum cartridge.
3) Do not look into the laser beam exposure slit of the laser optical unit with the connector connected when removing and installing the optical system.
4) The middle frame contains the safety interlock switch.

   Do not defeat the safety interlock by inserting wedges or other items into the switch slot.



LASER WAVE – LENGTH : 780 ~ 795
Pulse times : 0.481ms/6mm
Out put power : 0.20 ± 0.03mW

CAUTION

INVISIBLE LASER RADIATION,

WHEN OPEN AND INTERLOCKS DEFEATED.

AVOID EXPOSURE TO BEAM.

VORSICHT

UNSICHTBARE LASERSTRAHLUNG,
WENN ABDECKUNG GEÖFFNET UND
SICHERHEITSVERRIEGELUNG ÜBERBRÜCKT.
NICHT DEM STRAHL AUSSETZEN.

VARO !

AVATTAESSA JA SUOJALUKITUS
OHITETTAESSA OLET ALTTIINA
NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE ÄLÄ
KATSO SÄTEESEEN.

ADVARSEL

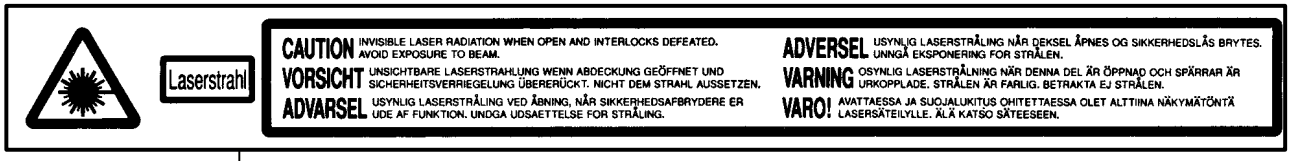
USYNLIG LASERSTRÅLNING VED ÅBNING, NÅR
SIKKERHEDSBRYDERE ER UDE AF
FUNKTION. UNDGÅ UDSAETTELSE FOR
STRÅLNING.

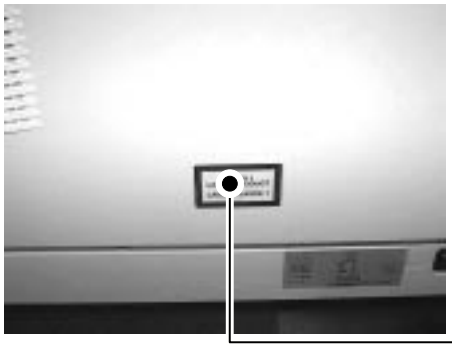
VARNING !

OSYNLIG LASERSTRÅLNING NÄR DENNA DEL
ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD.
BETRAKTA EJ STRÅLEN. – STRÅLEN ÄR
FARLIG.

At the production line, the output power of the scanner unit is adjusted to 0.57 MILLI-WATT PLUS 20 PCTS and is maintained constant by the operation of the Automatic Power Control (APC). Even if the APC circuit fails in operation for some reason, the maximum output power will only be 15 MILLI-WATT 0.1 MICRO-SEC. Giving and accessible emission level of 42 MICRO-WATT which is still-less than the limit of CLASS-1 laser product.

Caution
This product contains a low power laser device. To ensure continued safety do not remove any cover or attempt to gain access to the inside of the product. Refer all servicing to qualified personnel.

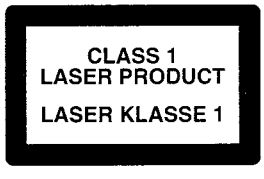

Laserstrahl
CAUTION INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED. AVOID EXPOSURE TO BEAM.
VORSICHT UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET UND SICHERHEITSVERRIEGELUNG ÜBERERÜCKT. NICHT DEM STRAHL AUSSETZEN.
ADVARSEL USYNLIG LASERSTRÅLING VED ÅBNING, NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGA UDSAETTELSE FOR STRÅLING.
ADVERSEL USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES OG SIKKERHEDSLÅS BRYTES. UNNGÅ EKSPONERING FOR STRÅLEN.
VARNING OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRRAR ÄR URKOPPLADE. STRÅLEN ÄR FARLIG. BETRAKTA EJ STRÅLEN.
VARO! AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTÖNTÄ LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.



The foregoing is applicable only to the 220V model, 230V model and 240V model.

VAROITUS! LAITTEEN KÄYTTÄMINEN MUULLA KUIN TÄSSÄ KÄYTTÖOHJEESSA MAINITULLA TAVALLA SAATTAA ALTISTAA KÄYTTÄJÄN TURVALLISUUSLUOKAN 1 YLITTÄVÄLLE NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE.

VARNING - OM APPARATEN ANVÄNDS PÅ ANNAT SÄTT ÄN I DENNA BRUKSANVISNING SPECIFICERATS, KAN ANVÄNDAREN UTSÄTTAS FÖR OSYNLIG LASERSTRÅLNING, SOM ÖVERSKRIDER GRÄNSEN FÖR LASERKLASS 1.



LUOKAN 1 LASERLAITE
KLASS 1 LASER APPARAT

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[1] GENERAL

1. Major functions

Configurations

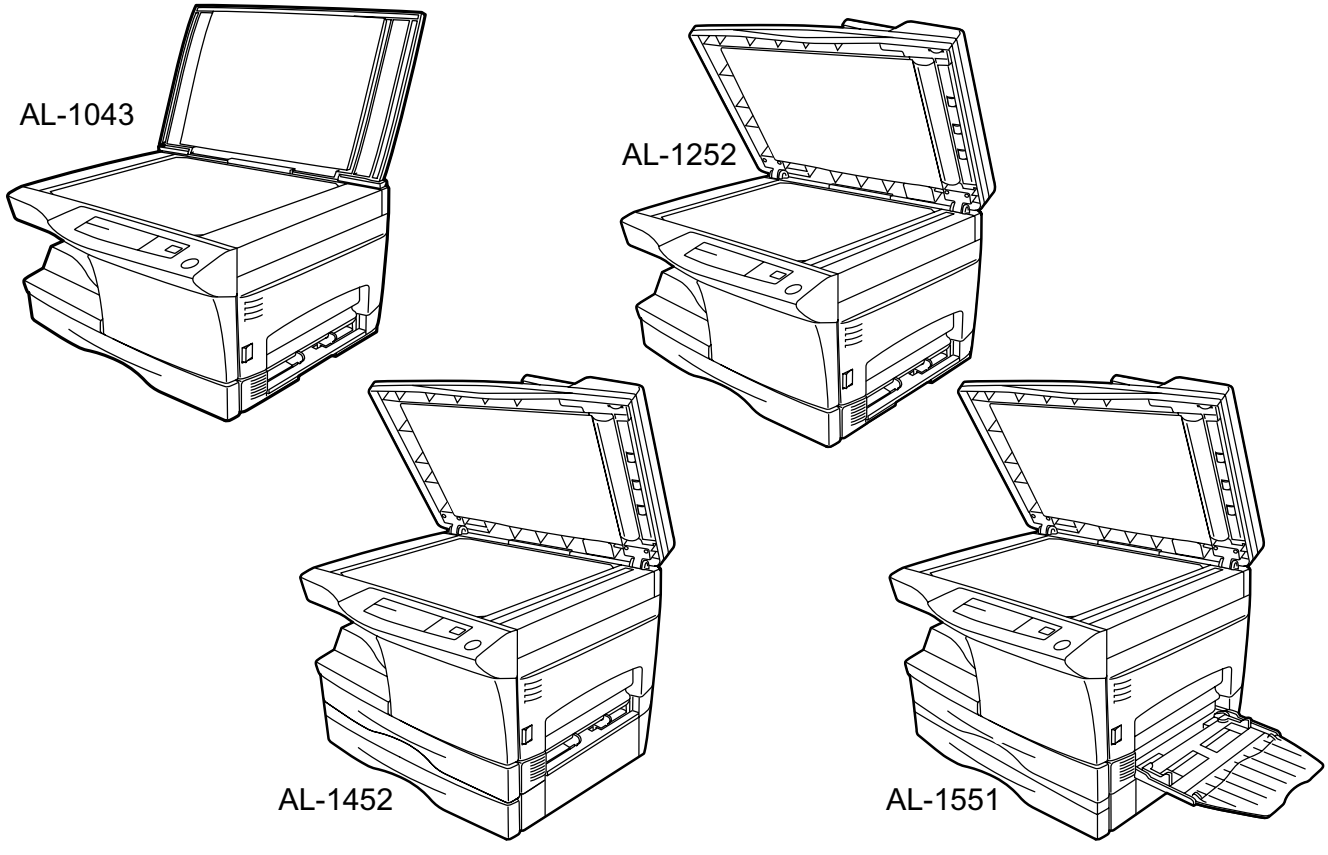
Item / Model	CPM	SB/MB	2 Tray	SPF	R-SPF	FAX	GDI with USB	GDI without USB	PCL with USB	SOPM	Duplex
AL-1043	10CPM	SB	×	×	×	×	×	○	×	×	×
AL-1252	12CPM	SB	×	○	×	×	×	○	×	○	×
AL-1452	14CPM	SB	○	○	×	×	×	○	×	○	×
AL-1551	15CPM	MB	○	×	○	×	×	○	×	○	○

Descriptions of items

CPM:	Copy speed (Copies Per Minute)
SB/MB:	SB = Manual feed single bypass, MB = Manual feed multi bypass
2 tray:	Second cassette unit.
SPF:	Original feed unit
R-SPF:	Duplex original feed unit
FAX:	FAX function.
GDI with USB:	GDI printer function with USB.
GDI without USB:	GDI printer function without USB.
PCL with USB:	PCL printer function with USB.
SOPM:	Scan Once Print Many function (Many copies are made by one scan.)
Duplex:	Auto duplex copy function

Descriptions of table

○: Standard provision
×: No function or no option available
Opt: Option



[2] SPECIFICATIONS

1. Basic Specifications

Item			
Type		Desktop	
Copy system		Dry, electrostatic	
Segment (class)		Digital personal copier	
Copier dimensions	AL-1043	20.4"(W)X17.5"(D)X11.5"(H) (518mm(W)X445mm(D)X293mm(H))	
	AL-1252	20.4"(W)X18.8"(D)X15.0"(H) (518mm(W)X477mm(D)X379mm(H))	
	AL-1452	20.4"(W)X18.8"(D)X18.3"(H) (518mm(W)X477mm(D)X464mm(H))	
	AL-1551	20.4"(W)X18.8"(D)X18.3"(H) (518mm(W)X477mm(D)X464mm(H))	
Weight (Approximately)	AL-1043	39.7lbs.(18Kg)	TD and drum cartridges included
	AL-1252	47.4lbs.(21.5Kg)	
	AL-1452	54.1lbs.(24.5Kg)	
	AL-1551	54.3lbs.(24.6Kg)	

2. Operation specifications

Section, item			Details	
Paper feed section	Paper feed system		AL-1043 / 1252	1 tray (250 sheet) + single bypass
			AL-1452	2 tray (500 sheet) + single bypass
			AL-1551	2 tray (500 sheet) + multi bypass (50 sheet)
	AB system	Tray paper feed section	Paper size	A4, B5, A5 (Landscape)
			Paper weight	56 - 80g/m^2 (15 - 21 lbs.)
			Paper feed capacity	250 sheets
			Kinds	Standard paper, specified paper, recycled paper
			Remark	User adjustment of paper guide available
		Multi bypass paper feed section	Paper size	A4, B5, A5, B6, A6 (Landscape)
			Paper weight	52 - 130g/m^2 (14 - 34.5 lbs.)
			Paper feed capacity	50 sheets
			Kinds	Standard paper, specified paper, recycled paper, OHP, Label, Postal card
			Remark	User adjustment of paper guide available
		Single bypass paper feed section	Paper size	A4, B5, A5, B6, A6 (Landscape)
			Paper weight	52 - 130g/m^2 (14 - 34.5 lbs.)
			Paper feed capacity	1 sheet
			Kinds	Standard paper, specified paper, recycled paper, OHP, Label, Postal card
			Remark	User adjustment of paper guide available
	Inch system	Tray paper feed section	Paper size	8-1/2" x 14", 8-1/2 x 11", 8-1/2" x 5-1/2" (Landscape)
			Paper weight	15 - 21 lbs.
			Paper feed capacity	250 sheets
			Kinds	Standard paper, specified paper, recycled paper
			Remark	User adjustment of paper guide available
		Multi bypass paper feed section	Paper size	8-1/2" x 14", 8-1/2 x 11", 8-1/2" x 5-1/2", 3-1/2" x 5-1/2" (Landscape)
			Paper weight	14 - 34.5 lbs.
			Paper feed capacity	50 sheets
			Kinds	Standard paper, specified paper, recycled paper, OHP, Label, Postal card
			Remark	User adjustment of paper guide available
		Single bypass paper feed section	Paper size	8-1/2" x 14", 8-1/2 x 11", 8-1/2" x 5-1/2" (Landscape)
			Paper weight	14 - 34.5 lbs.
			Paper feed capacity	1 sheet
			Kinds	Standard paper, specified paper, recycled paper, OHP, Label, Postal card
			Remark	User adjustment of paper guide available
Paper exit section		Exit way		Face down
		Capacity of output tray		100 sheets

Section, item			Details		
Originals		Original set			Center Registration (left edge)
		Max. original size			B4 (10" x 14")
		Original kinds			sheet, book
		Original size detection			None
Optical section	Scanning section	Scanning system			CCD sensor scanning by lighting lamp scanner
		CCD sensor	Resolution		400 dpi
		Lighting lamp	Type		Xenon lamp
			Voltage		1.5kV
			Power consumption		11 ± 3W
		Gradation			256 gradations/8bit
	Writing section	Writing system			Writing to OPC drum by the semiconductor laser
		Laser unit	Resolution		600 dpi
Image forming		Photoconductor	type		OPC (30ø)
			Life		18k
		Charger	Charging system		Saw -tooth charging with a grid, / (-) scorotron discharge
			Transfer system		(+) DC corotron system
			Separation system		(-) DC corotron system
		Developing	Developing system		Dry, 2-component magnetic brush development system
		Cleaning	Cleaning system		Counter blade system (Counter to rotation)
Fusing section		Fusing system			Heat roller system
		Upper heat roller	type		Teflon roller
		Lower heat roller	type		Silicon rubber roller
		Heater lamp	type		Halogen lamp
			Voltage		100V
			Power consumption		800W
Electrical section		Power source	Voltage		100V, 110V, 120/127V, 230V, 240V
			Frequency		Common use for 50 and 60Hz
		Power consumption	Max.		1000W
			Average (during copying)	AL-1043	260Wh/H *1)
				AL-1252	280Wh/H *1)
				AL-1452	280Wh/H *1)
				AL-1551	310Wh/H *1)
			Average (stand-by)		70Wh/H *1)
			Pre-heat mode		40Wh/H *1)
			Auto power shut-off mode		20Wh/H *1)

*1) May fluctuate due to environmental conditions and the input voltage.

3. Copy performance

Section, item			Details	AL-1043	AL-1252	AL-1452	AL-1551
Copy magnification		Fixed magnification ratios		3 Reduction + 2 Enlargement (AB system : 50, 70, 81, 100, 141, 200%) (Inch system : 50, 64, 78, 129, 100, 200%)			
		Zooming magnification ratios		50 - 200% (151 steps in 1% increments)			
Manual steps (manual, photo)				5 steps			
Copy speed		First copy time	Tray paper feed	9.6 sec. (Pre-heat mode:16 sec. or below / Auto power-shut-off mode : 23 sec. or below)			
			Manual paper feed	Single : 10.0 sec. / Multi : 8.0sec (Pre-heat mode:16 sec. or below / Auto power-shut-off mode : 23 sec. or below)			
	AB system A4 (Landscape)	Copy speed (CPM)	Same size	10	12	14	15
			Enlargement	10	12	14	15
			Reduction	10	12	14	15
	AB system B5 (Landscape)	Copy speed (CPM)	Same size	10	12	14	15
			Enlargement	10	12	14	15
			Reduction	10	12	14	15
	Inch system 8-1/2" x 14" (Landscape)	Copy speed (CPM)	Same size	10	12	14	15
			Enlargement	10	12	14	15
			Reduction	10	12	14	15
	Inch system 8-1/2" x 11" (Landscape)	Copy speed (CPM)	Same size	10	12	14	15
			Enlargement	10	12	14	15
			Reduction	10	12	14	15
Max. continuous copy quantity				99			
Void		Void area	leading edge	1 - 4mm			
			Trailing edge	4mm or less			
			Side edge void area	3mm or less/per side			
		Image loss	leading edge	same size: 3.0mm or less / Enlarge (200%): 1.5mm or less / Reduction (50%): 6.0mm or less			
			Trailing edge	same size: 3.0mm or less / Enlarge (200%): 1.5mm or less / Reduction (50%): 6.0mm or less			
			Side edge void area	same size: 3.0mm or less / Enlarge (200%): 1.5mm or less / Reduction (50%): 6.0mm or less			
Warm-up time				0 sec.			
Power save mode reset time				0 sec.			
Paper jam recovery time				0 sec.			

4. Printer specifications

Resolution	600 or 300 can be selected.
Page description language	SHARP GDI
Page onentation	Portrait or Landscape
First print time	Approx. 9.6 seconds*
Print speed(multiple pages)	Max.12 pages per minute(letter or A4)
Interface port	Bi-directional parallel interface(IEEE 1284 compliant)

* First print time may differ depending on operating conditions, such as power-supply voltage and room temperature.
Also the time may differ depending on data quantity to be printed and applications.

5. SPF

Original capacity	30 sheets (52 to 90g/m^2)(14 to 23.9 lbs.)
Original size	B4 to A5/10" x 14" to 5-1/2" x 8-1/2"
Original replacement speed	12CPM(A4/8-1/2" x 11"Landscape)(14CPM model)
Original placement	Face up
Original weight	52 to 90g/m^2(14 - 23.9lbs.)
Mixed feeding(Paper size)	Performance Degraded
Original which cannot	Thermal papers, originals with punch holes for files, be used folded paper, transparent originals such as OHP films, stapled or clip used originals with cover up liquid used, Originals with tape sealed, originals with high level frictional coefficient such as photos or catalogs.

6. RSPF

Original capacity		30 sheets (52 to 90g/m^2)(14 to 23.9 lbs.)	
Original size		B4 to A5/10" x 14" to 5-1/2" x 8-1/2"	
Original replacement speed		12CPM(A4/8-1/2" x 11"Landscape)(15CPM model)	
Job speed(Tray1,Landscape)	Single copy	S to S	12CPM
		S to D	5.6CPM
		D to S	5.5CPM
		D to D	5.2CPM
	Multi copy	S to S	15CPM
		D to S	15CPM
Original placement		Face up	
Original weight		52 to 90g/m^2(14 - 23.9lbs.)	
Mixed feeding(Paper size)		Performance Degraded	
Original which cannot		Thermal papers, originals with punch holes for files, be used folded paper, transparent originals such as OHP films, stapled or clip used originals with cover up liquid used, Originals with tape sealed, originals with high level frictional coefficient such as photos or catalogs.	

[3] CONSUMABLE PARTS

1. Supply system table

Common to all destinations

No.	Name	Content	Life	Product name	Package
1	Develop cartridge (Black) x 1 (Except Europe)	Toner/developer cartridge x 1 (Toner: Net weight 220g)(Developer: Net weight 190g)	6K (5% document)	AL-100TD	5
2	Develop cartridge (Black) x 1 (Except Europe)	Toner/developer cartridge x 1 (Toner: Net weight 124g)(Developer: Net weight 190g)	4K (5% document)	AL-110TD	5
3	Develop cartridge (Black) x 1 (Europe)	Toner/developer cartridge x 1 (Toner: Net weight 124g)(Developer: Net weight 190g)	4K (5% document)	AL-110DC	5
4	Drum cartirdge	Drum cartridge	18K	AL-100DR	5

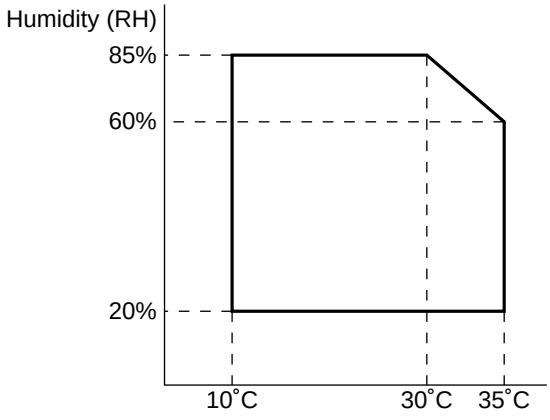
2. Environmental

The environmental conditions for assuring the copy quality and the machine operations are as follows:

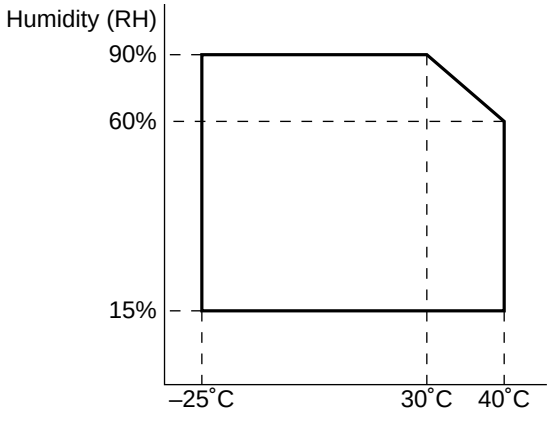
(1) Normal operating condition

Temperature:20 - 25°C
Humidity:65 ± 5%RH

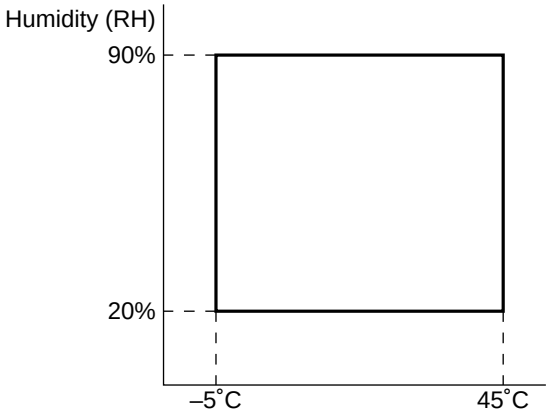
(2) Acceptable operating condition



(3) Optical condition

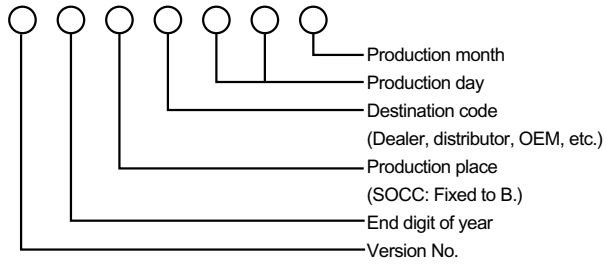


(4) Supply storage condition



3. Production control number(lot No.) identification

<Developing cartridge>

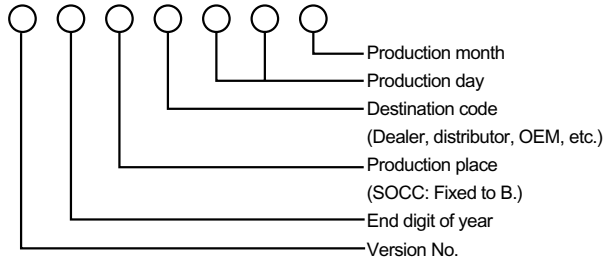


* Destination

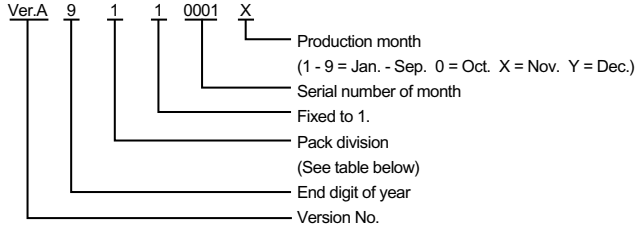
Division		No.
EX Destination	A same pack	G
	B same pack	H
Option Destination	A	P
	B	Q

<Drum cartridge>

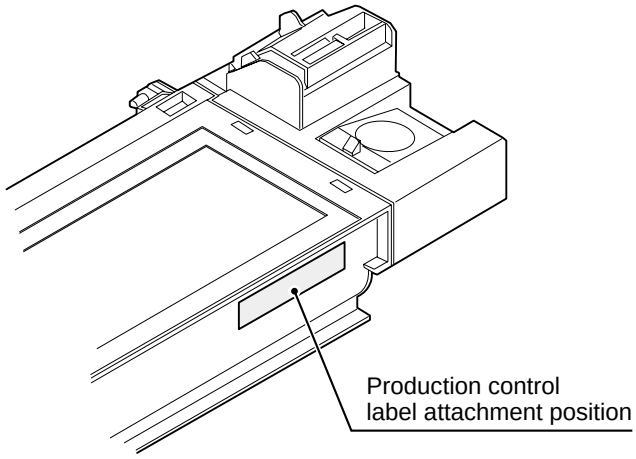
The label on the drum cartridge shows the date of production.
(SOCC production)

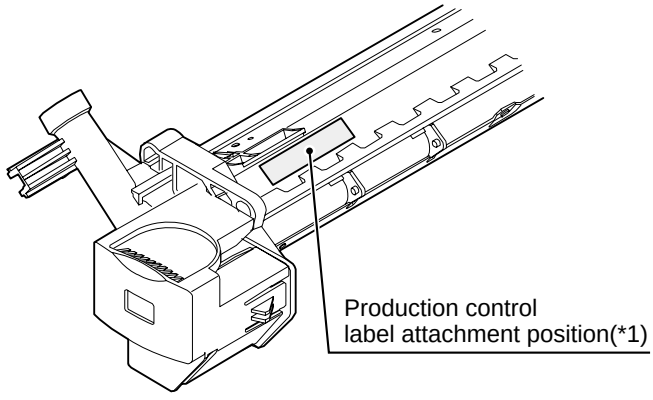


<JAPAN production>


Ver.A 9 1 1 0001 X
Production month
(1 - 9 = Jan. - Sep. 0 = Oct. X = Nov. Y = Dec.)
Serial number of month
Fixed to 1.
Pack division
(See table below)
End digit of year
Version No.

Division	No.
Ex production	1
Option	2
Same pack	3

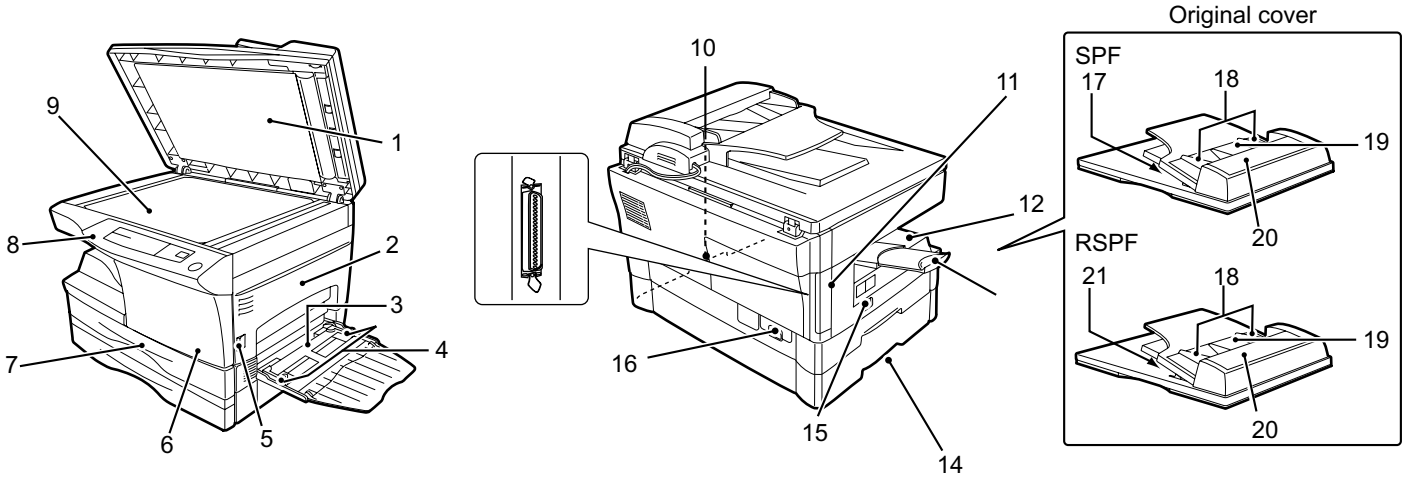




*1 The production control label is not attached to the cartridge of a China product.

[4] EXTERNAL VIEWS AND INTERNAL STRUCTURES

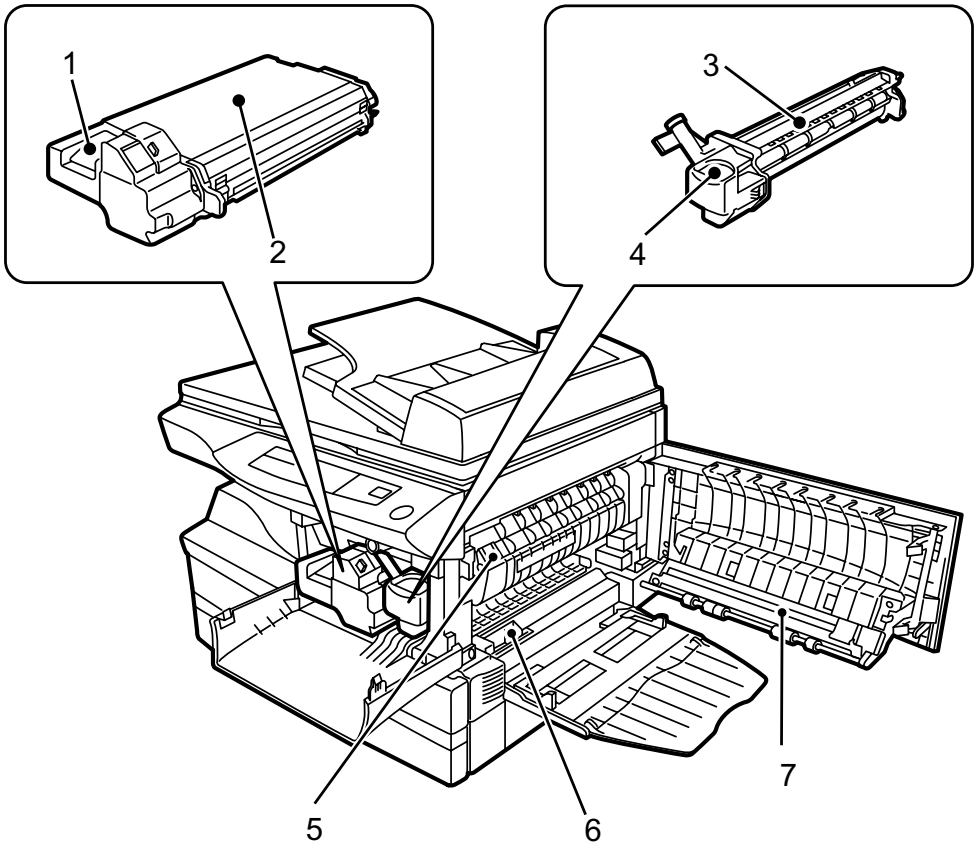
1. Appearance



1	Original cover	2	Side cover	3	Bypass tray
4	Bypass tray guides	5	Side cover open button	6	Front cover
7	Paper tray	8	Operation panel	9	Original table
10	Handle	11	GDI printer interface	12	Paper output tray
13	Paper output tray extension	14	Handle	15	Power switch
16	Power cord socket	17	SPF exit area *1	18	Original guides
19	Document feeder tray	20	Feeding roller cover	21	RSPF exit area *2

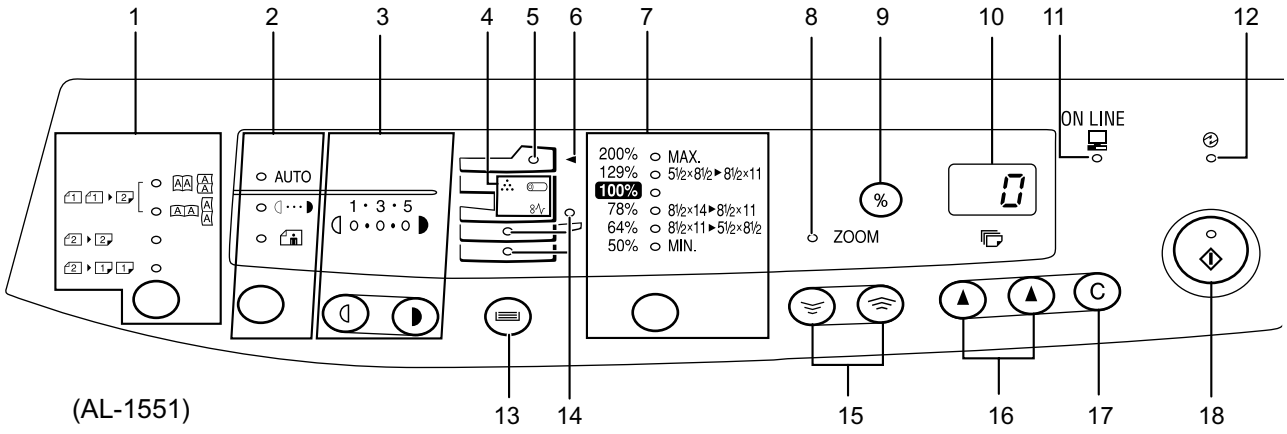
*1 SPF only *2 RSPF only

2. Internal



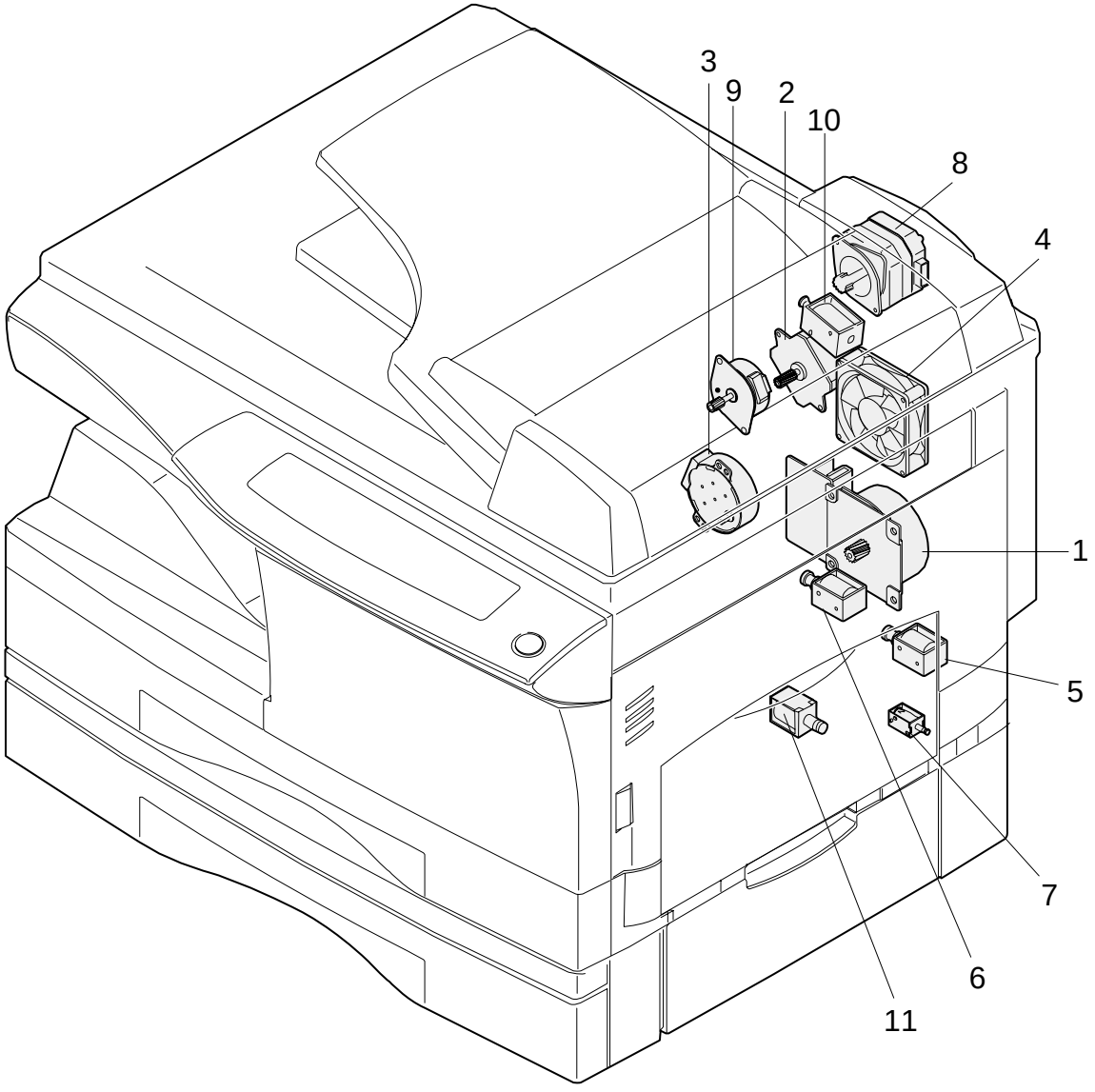
1	TD cartridge lock release button	2	TD cartridge	3	Drum cartridge
4	Drum cartridge handle	5	Fusing unit release lever	6	Charger cleaner
7	Transfer charger				

3. Operation panel



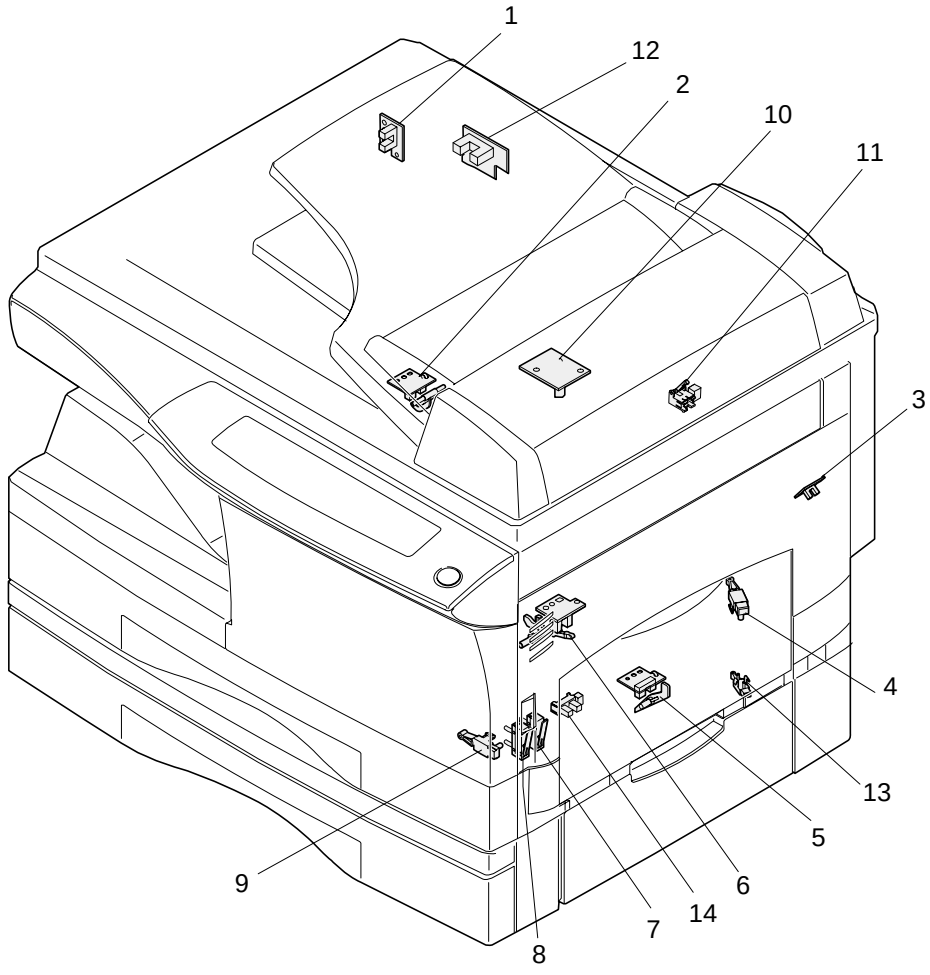
1	**Duplex Mode select key and indicator** (RSPF only)	2	**Exposure mode selector key and indicators** Use to sequentially select the exposure modes: AUTO, MANUAL or PHOTO. Selected mode is shown by a lit indicator.
3	**Light and dark keys and exposure indicators** Use to adjust the MANUAL or PHOTO exposure level. Selected exposure level is shown by a lit indicator.Use to start and terminate user program setting.	4	**Alarm indicators** Drum replacement required indicator Misfeed indicator TD cartridge replacement required indicator
5	**SPF indicator**	6	**SPF misfeed indicator**
7	**Copy ratio selector key and copy ratio indicators** Use to sequentially select preset reduction/enlargement copy ratios. Selected copy ratio is shown by a lit indicator.	8	**Zoom indicator**
9	**Copy ratio display (%) key**	10	**Display** Displays the specified copy quantity, zoom copy ratio, user program code, and error code.
11	**ON LINE indicator** Lights up when the machine is used as a printer.	12	**Power save indicator** Lights up when the copier is in a power save mode.
13	**Tray select key** Use to select a paper feed station (paper tray or bypass tray).	14	**Paper feed location indicators** Light up to show the selected paper feed station.
15	**Zoom keys** Use to select any reduction or enlargement copy ratio from 50% to 200% in 1% increments.	16	**Copy quantity keys** •Use to select the desired copy quantity (1 to 99). •Use to make user program entries.
17	**Clear key** •Press to clear the display, or press during a copy run to terminate copying. •Press and hold down during standby to display the total number of copies made to date.	18	**Print key and ready indicator** •Copying is possible when the indicator is on. •Use to set a user program.

4. Motors and solenoids



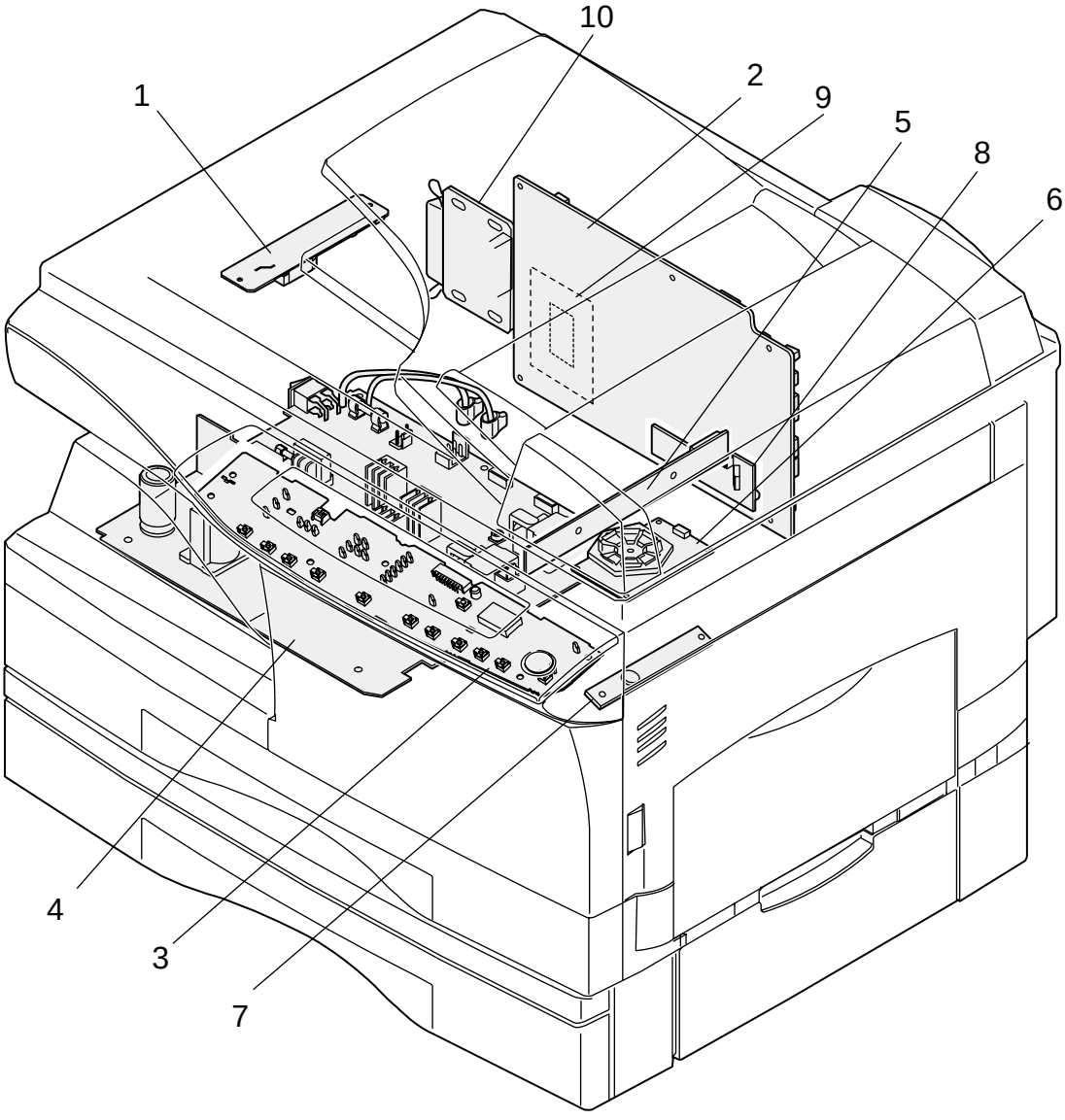
No.	Part name	Control signal	Function,operation
1	Main motor	MM	Drives the copier.
2	Mirror motor	MRMT	Drives the optical mirror base (scanner unit).
3	Toner motor	TM	Supplies toner.
4	Cooling fan motor	VFM	Cools the optical section.
5	Resist roller solenoid	RRS	Resist roller rotation control solenoid
6	Paper feed solenoid	CPFS1	Cassette Paper feed solenoid 1
7	Multi paper feed solenoid	MPFS	Multi manual pages feed solenoid
8	SPF motor	SPFM	Drives the single pass feeder
9	Duplex motor	DMT	Devices the duplex paper transport section
10	Original feed solenoid	SPUS	Original feed solenoid
11	Paper feed solenoid	CPFS2	Cassette Paper feed solenoid 2

5. Sensors and switches



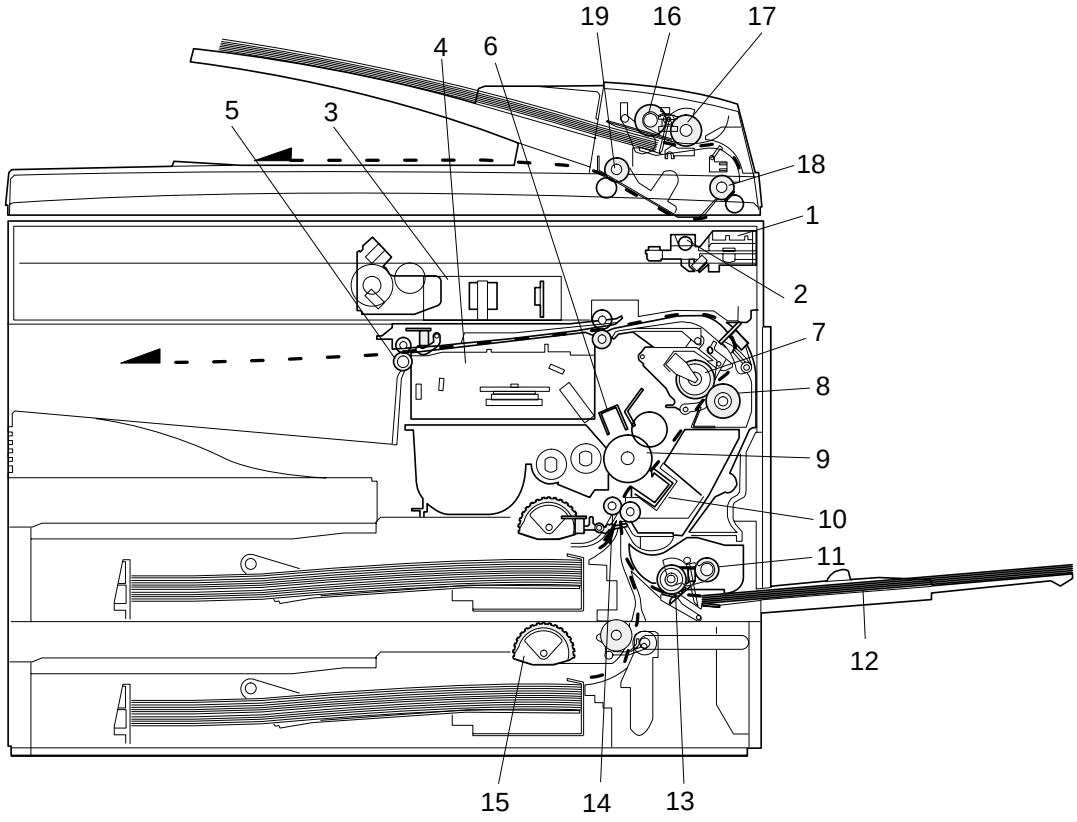
No.	Name	Signal	Type	Function	Output
1	Mirror home position sensor	MHPS	Transmission sensor	Mirror (scanner unit) home position detection	"H" at home position
2	POD sensor	POD	Transmission sensor	Paper exit detection	"H" at paper pass
3	PPD2 sensor	PPD2	Transmission sensor	Paper transport detection 2	"L" at paper pass
4	Cassette detection switch	CED1	Microswitch	Cassette installation detection	"H" at cassette insertion
5	Manual feed detection switch	MFD	Transmission sensor	Manual feed paper detection (single only)	"L" at paper detection
6	PPD1 sensor	PPD1	Transmission sensor	Paper transport detection 1	"L" at paper pass
7	Door switch	DSW	Micro switch	Door open/close detection (safety switch for 5V)	1 or 0V of 5V at door open
8	Door switch	DSW	Micro switch	Door open/close detection (safety switch for 24V)	1 or 0V of 24V at door open
9	Drum reset switch	DRST	Micro switch	New drum detection switch	Instantaneously "H" at insertion of new drum
10	SPF sensor	SPID/ SD SW	Transmission sensor	Paper entry detection Cover open/close detection	"L" at paper pass
11	SPPD sensor	SPPD	Transmission sensor	Paper transport detection	"L" at paper pass
12	SDOD sensor	SDOD	Transmission sensor	SPF open/close detection Book sensor	"L" at paper pass
13	2nd cassette	DSW	Micro switch	2nd cassette door open detection	1 or 0V of 5V at door open
14	PPD3 sensor	PPD3	Transmission sensor	Paper transport detection 3	"L" at paper pass

6. PWB unit



No.	Name	Function
1	Exposure lamp invertor PWB	Exposure lamp (Xenon lamp) control
2	Main PWB (MCU)	Copier control
3	Operation PWB	Operation input/display
4	Power PWB	AC power input, DC voltage control, High voltage control
5	CCD sensor PWB	For image scanning
6	LSU motor PWB	For polygon motor drive
7	TCS PWB	For toner sensor control
8	LSU PWB	For laser control
9	Memory PWB 6MB	For memorying data
10	GDI Printer PWB	GDI Printer control

7. Cross sectional view



No.	Part name	Function and operation
1	Scanner unit	Illuminates the original with the copy lamp and passes the reflected light to the lens unit(CCD).
2	Exposure lamp	Exposure lamp (Xenon lamp) Illuminates original
3	Lens unit	Scans the original image with the lens and the CCD.
4	LSU (Laser unit)	Converts the original image signal into laser beams and writes onto the drum.
5	Paper exit roller	Roller for paper exit
6	Main charger	Provides negative charges evenly to the drum surface.
7	Heat roller	Fuses toner on the paper. (Teflon roller)
8	Pressure roller	Fuses toner on the paper. (Silicon rubber roller)
9	Drum	Forms images.
10	Transfer unit	Transfers images onto the drum.
11	Pickup roller	Picks up the manual feed paper. (In multi feed only)
12	Manual paper feed tray	Tray for manual feed paper
13	Manual paper feed roller	Transport the paper from the manual paper feed port.
14	PS roller unit	Takes synchronization between the lead edge and the rear edge of the paper.
15	Paper feed roller	Picks up a sheet of paper from the cassette.
16	Pickup roller	Picks up documents.
17	Separation roller	Separates documents to feed properly.
18	PS roller	Feeds documents to the scanning section.
19	Paper exit roller	Discharges documents.

[5] UNPACKING AND INSTALLATION

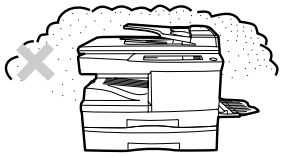
1. Copier installation

Improper installation may damage the copier. Please note the following during initial installation and whenever the copier is moved.

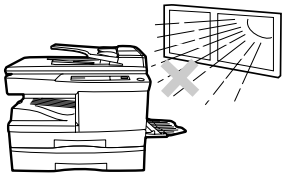
Caution: If the copier is moved from a cool place to a warm place, condensation may form inside the copier. Operation in this condition will cause poor copy quality and malfunctions.
Leave the copier at room temperature for at least 2 hours before use.

Do not install your copier in areas that are:

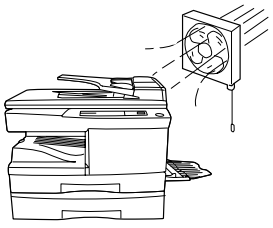
- damp, humid, or very dusty



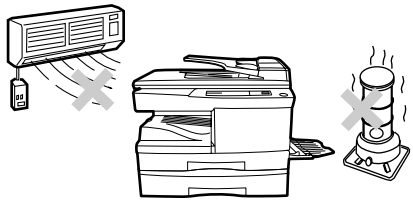
- exposed to direct sunlight



- poorly ventilated



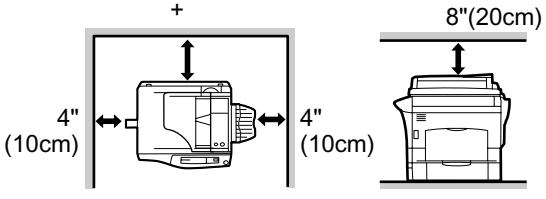
- subject to extreme temperature or humidity changes, e.g., near an air conditioner or heater.



The copier should be installed near an accessible power outlet for easy connection.

Be sure to connect the power cord only to a power outlet that meets the specified voltage and current requirements.
Also make certain the outlet is properly grounded.

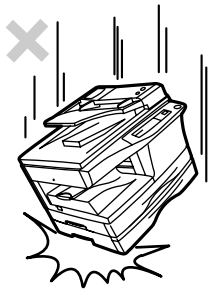
Be sure to allow the required space around the machine for servicing and proper ventilation.



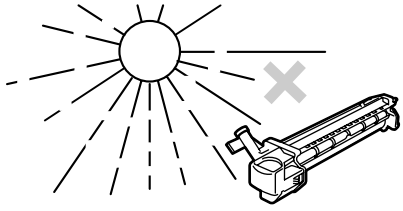
2. Cautions on handling

Be careful in handling the copier as follows to maintain the performance of this copier.

Do not drop the copier, subject it to shock or strike it against any object.



Do not expose the drum cartridge to direct sunlight.
Doing so will damage the surface (green portion) of the drum cartridge, causing poor print quality.



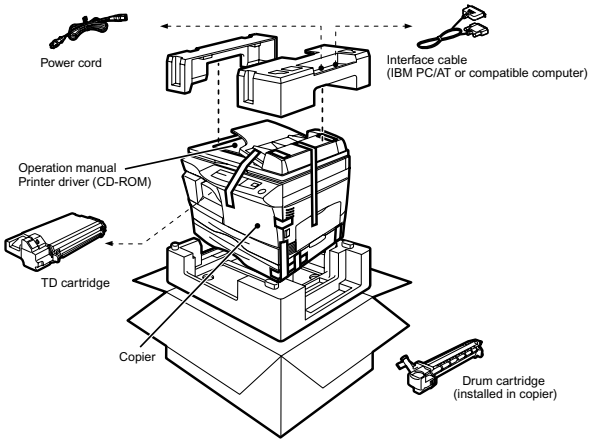
Store spare supplies such as drum cartridges and TD cartridges in a dark place without removing from the package before use.

If they are exposed to direct sunlight, poor print quality may result.

Do not touch the surface (green portion) of the drum cartridge.
Doing so will damage the surface of the cartridge, causing poor print quality.

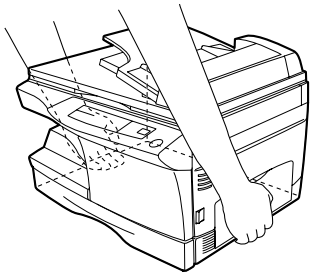
3. Checking packed components and accessories

Open the carton and check if the following components and accessories are included.



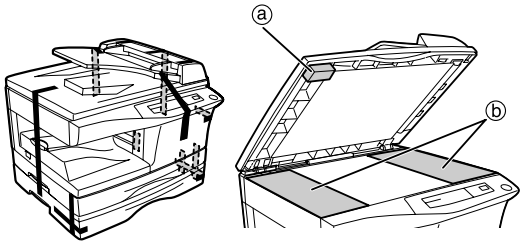
4. Unpacking

Be sure to hold the handles on both sides of the copier to unpack the copier and carry it to the installation location.

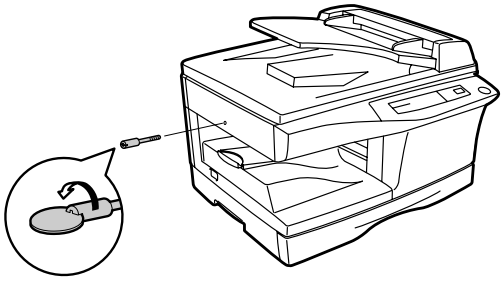


5. Removing protective packing materials

1) Remove pieces of tape and protective cover. Then open the original cover and remove protective materials (a) and (b).



2) Use a coin (or suitable object) to remove the screw.
Store the screw in the paper tray because it will be used if the copier has to be moved.



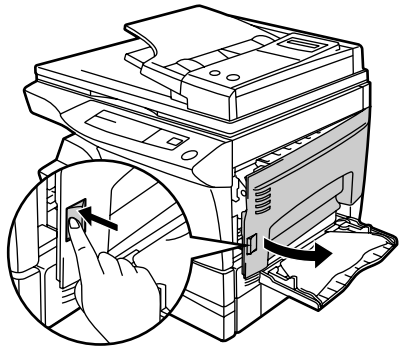
6. Installing the TD cartridge

The TD cartridge replacement required (∴) indicator will light up when toner is needed. If copying is continued while the ∴ indicator is lit, copies will gradually become lighter until the copier stops and the indicator begins blinking. Replace the old TD cartridge by following the procedure given below.

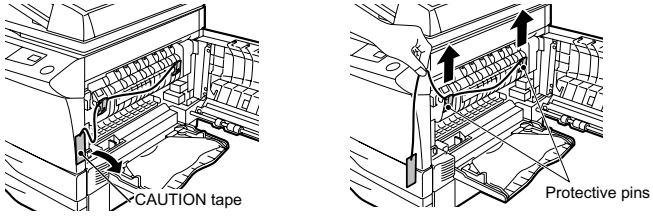
Note:

- After the copier stops, it may be possible to make a few more copies by taking the TD cartridge out of the copier, shaking it horizontally, then reinstalling it. If copying is not possible after this operation, replace the TD cartridge.
- During long copy run of a dark original, the ready (⇳) indicator may blink, the ∴ indicator may light up, and the copier may stop, even though toner cartridge is not empty. The copier will feed toner up to 2 minutes and then the ready (⇳) indicator will light up. Press the print (⇳) key to restart copying.

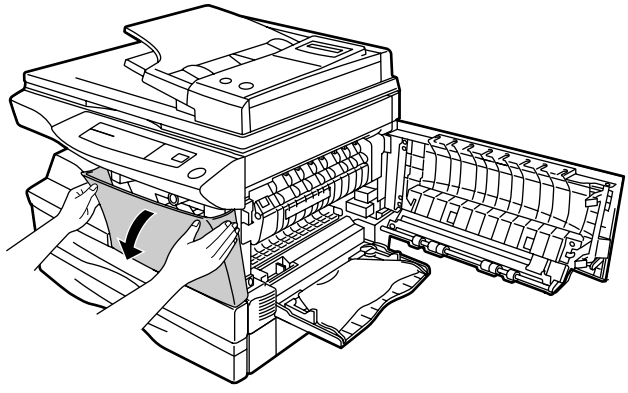
1) Ensure that the bypass tray is open and then open the side cover by pressing the open button on the side cover.



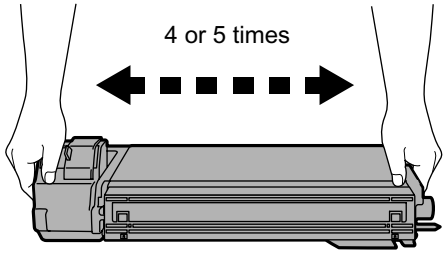
2) Remove the CAUTION tape from the front cover and remove the two protective pins from the fusing unit by pulling the strings upward one at a time.



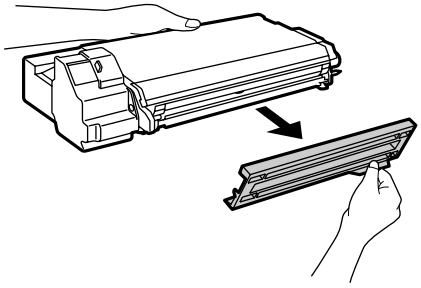
3) Push gently on both sides of the front cover to open the cover.



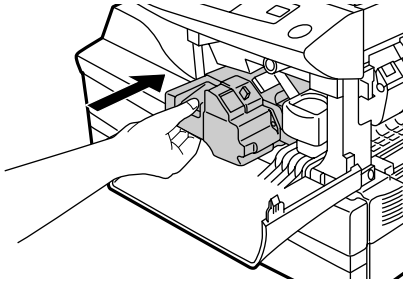
4) Remove the TD cartridge from the bag. Remove the protective paper. Hold the cartridge on both sides and shake it horizontally four or five times.



5) Hold the tab of the protective cover and pull the tab to remove the cover.

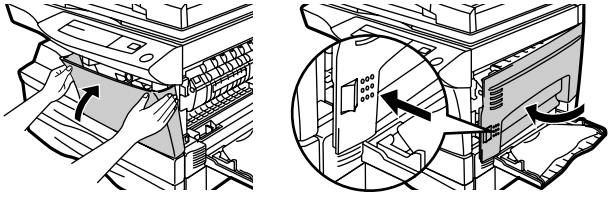


6) Gently insert the TD cartridge until it locks in place.



7) Close the front cover and then the side cover by pressing the round projections near the side cover open button. The ⓘ indicator will go out and the ready (∴) indicator will light up.

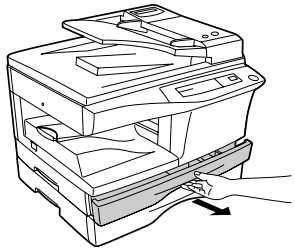
Note: When closing the covers, be sure to close the front cover securely and then close the side cover. If the covers are closed in the wrong order, the covers may be damaged.



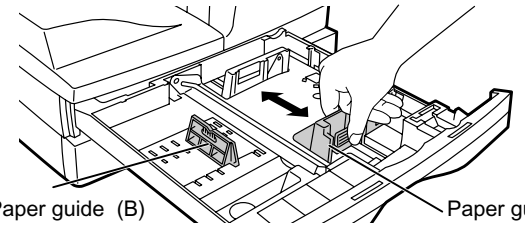
7. Loading copy paper

Note: This copier is equipped with two paper trays. Load copy paper into the two paper trays.

1) Raise the handle of the paper tray and pull the paper tray out until it stops.

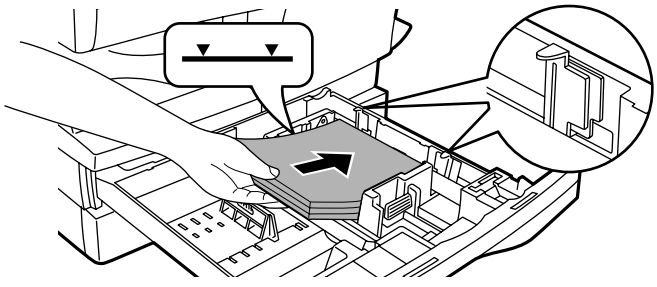


2) Remove the pressure plate lock. Rotate the pressure plate lock in the direction of the arrow to remove it while pressing down the pressure plate of the paper tray.
3) Store the pressure plate lock which has been removed in step 2 and the screw which has been removed when unpacking in the front of the paper tray. To store the pressure plate lock, rotate the lock to fix it on the relevant location.
4) Adjust the paper guides on the paper tray to the copy paper width and length.
   Squeeze the lever of paper guide (A) and slide the guide to match with the width of the paper.
   Move paper guide (B) to the appropriate slot as marked on the tray.



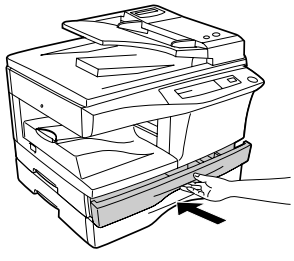
5) Fan the copy paper and insert it into the tray. Make sure the edges go under the corner hooks.

Note: Do not load paper above the maximum height line (▼▼). Exceeding the line will cause a paper misfeed.



6) Gently push the paper tray back into the copier.

Note: After loading copy paper, to cancel the blinking "H" without restarting copying, press the clear (Ⓒ) key. The "P" in the display will go out and the ready (ⓘ) indicator will light up.



8. Power to copier

1) Ensure that the power switch of the copier is in the OFF position. Insert the attached power cord into the power cord socket at the rear of the copier.
2) Plug the other end of the power cord into the nearest outlet.

9. Installing the printer driver

(Description of the printer driver)

The printer driver is the software program which runs the printer. It converts the data in your file into information that the printer can understand. It also controls communication between the printer and computer as the data is printed.

(Checking the hardware and software requirements)

You will need the following hardware and software in order to install the printer driver.

Computer type	IBM PC/AT or compatible computer equipped with a bi-directional parallel interface and CD-ROM drive
Windows type	Windows 3.1x, Windows 95, Windows 98, Windows Me, Windows NT 4.0, Windows 2000
Display	640 x 480 dots (VGA) or better
Hard disk free space	10 MB or more

Hardware requirements, such as CPU performance rating and amount of RAM installed, are the same as for your operating system.

- The printer driver included in this product cannot be used under Windows NT 3.5x, OS/2, pure MS-DOS and other operating systems which are not described above.
- If you are using some of your computer's memory as a RAM drive, the printer driver may not be allocated the correct amount of memory. In such a case, reduce the size of your RAM disk, or do not use the RAM disk. Please refer to your MS Windows documentation for further information.

(Installing the printer driver)

The software for your printer is provided on CD-ROM.
Before installing the printer driver, be sure to check the following items.

- Is the printer connected properly to the computer?
- Does the printer have paper?
- Is there another GDI printer driver or Windows Printing System printer driver already installed? If installed, change the printer port setting.

A. Windows 95/Windows NT 4.0

1) Load paper into the paper tray of the printer.
2) Turn on the printer.
3) Turn on your computer and start Windows.

- Before installing the printer driver, be sure to close all other applications which may be open.

4) When using Windows 95 on a personal computer with plug & play, the "Update Device Driver Wizard" window will appear. Insert the installation CD-ROM into the CD-ROM drive. Click the Next button and follow the on-screen instructions. If the "Copying Files" window appears during this operation, enter R:\ (substitute the letter of your CD-ROM drive for "R"), click the OK button and follow the on-screen instructions.

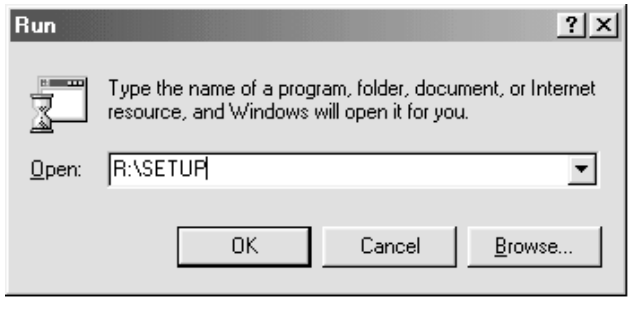
Update Device Driver Wizard
This wizard will complete the installation of:
SHARP AL-1000 Series
by searching your local drives, network, and Internet locations for the most current driver.
If you have a disk or CD-ROM that came with this device, insert it now.
It is recommended that you let Windows search for an updated driver. To do this, click Next to continue.
< Back
Next >
Cancel

- If you are using Windows 95 and the "New Hardware Found" window will appear, select Driver from Disk Provided by Hardware Manufacturer and then click the OK button. Proceed to step 6.
- If you are using Windows 95 and the screen shown above or the "New Hardware Found" window does not appear, proceed to step 5.
- If you are using Windows NT 4.0, proceed to step 5.

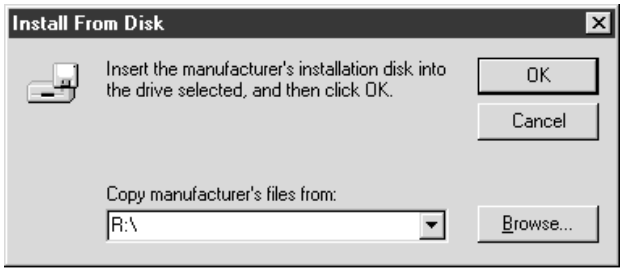
* Plug & play
This feature is effective if both the computer and peripheral equipment are equipped with IEEE 1284 compliant parallel interface.

Note: The screen displayed depends on the version of Windows.

5) Insert the installation CD-ROM into the CD-ROM drive.
Click the Start button and select Run. When the screen shown below appears, type R:\SETUP(substitute the letter of your CD-ROM drive for "R") and click the OK button. Follow the on-screen instructions.



6) The "Install From Disk" window will appear. Insert the installation CD-ROM into the CD-ROM drive. Type R:\ (substitute the letter of your CD-ROM drive for "R") and click the OK button.
Follow the on-screen instructions.



B. Windows 98:

1) Load paper into the paper tray of the printer.
2) Turn on the printer.
3) Turn on your computer and start Windows.

• Before installing the printer driver, be sure to close all other applications which may be open.

4) When using Windows 98 on a personal computer with plug & play, the "Add New Hardware Wizard" window will appear. Click the Next button and follow the on-screen instructions.

• If the "Add New Hardware Wizard" window does not ap-pear, proceed to step 8.

Add New Hardware Wizard
This wizard searches for new drivers for:
SHARP AL-1000 Series
A device driver is a software program that makes a hardware device work.
< Back
Next >
Cancel

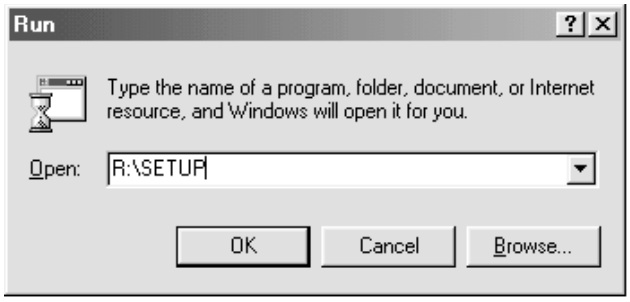
5) Select Search for the best driver for your device and click the Next button.

6) Insert the installation CD-ROM into the CD-ROM drive.
Select CD-ROM drive and click the Next button.

Add New Hardware Wizard
Windows will search for new drivers in its driver database on your hard drive, and in any of the following selected locations. Click Next to start the search.
Floppy disk drives
CD-ROM drive
Microsoft Windows Update
Specify a location:
Browse...
< Back
Next >
Cancel

7) Windows driver file search will find the device “SHARP AL-1000 Series”. Click the Next button and follow the on-screen instructions.

8) Insert the installation CD-ROM into the CD-ROM drive. Click the Start button and select Run. When the window shown below appears, type R:\SETUP (substitute the letter of your CD-ROM drive for "R") and click the OK button.
Follow the on-screen instructions.



C. Windows Me/Windows 2000:

1) Load paper in the paper tray of the printer.
2) Turn on the printer.
3) Turn on your computer and start Windows.

• If a Plug & Play dialog box appears when you start Windows, click the Cancel button to close the dialog box.

• Before installing the printer driver, be sure to close all other applications which may be open.

4) Insert the installation CD-ROM into the CD-ROM drive. Click the Start button and select Run. Type R:\SETUP (substitute the letter of your CD-ROM drive for "R") and click the OK button. Follow the on-screen instructions.

• If the "Found New Hardware Wizard" window appears when you start Windows after installing the printer driver, click the Finish button.

D. Windows 3.1x:

1) Load paper into the paper tray of the printer.

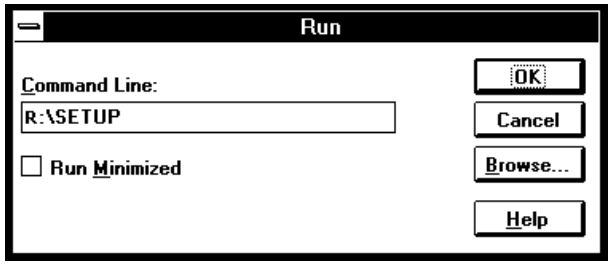
2) Turn on the printer and then start Windows on your computer.

• Before installing the printer driver, be sure to close all other applications which may be open.

3) Insert the installation CD-ROM into a CD-ROM drive.

4) Choose File from the Menu bar in Program Manager, and then choose the Run... command.

5) Type R:\SETUP (substitute the letter of your CD-ROM drive for "R") in the command line box and then click the OK button..



6) Follow the on-screen instructions.

E. AL-1000 Series printer driver group

When the printer driver is installed, the SHARP AL-1000 Series printer driver group will be created. This group allows the following functions to be executed.

Uninstall AL-1000 Series

The printer driver can be uninstalled. If the driver is uninstalled, printing cannot be performed on the printer. For proper uninstallation, be sure to use uninstallation program of the printer driver group.

Readme

The latest information on the printer driver is included in this note. Read the Readme first.

Advanced Settings

See help for application support and application problems that may occur when printing. See help for the applicable method of usage.

Status Monitor

The printer state and information on current printing are displayed on the status monitor window.

DOS Emulation Setup

Status Monitor HELP

DOS Emulation HELP

Advanced Settings HELP

- Be sure to read "Readme" found in the printer driver group before starting to print from application programs.

10.Parallel interface

This printer uses a bi-directional parallel interface. Use the sup-plied interface cable.

Connector

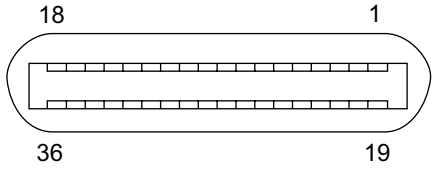
36-pin DDK 57LE-40360-730B (D29) female connector or equivalent connector

Cable

Shielded type bi-directional parallel interface For best results, use a printer interface cable which is IEEE1284 compliant.

Pin configuration

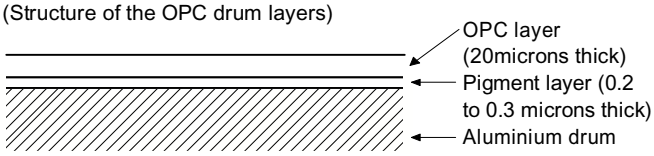
The pin numbers and signal names are listed in the follow-ing table.



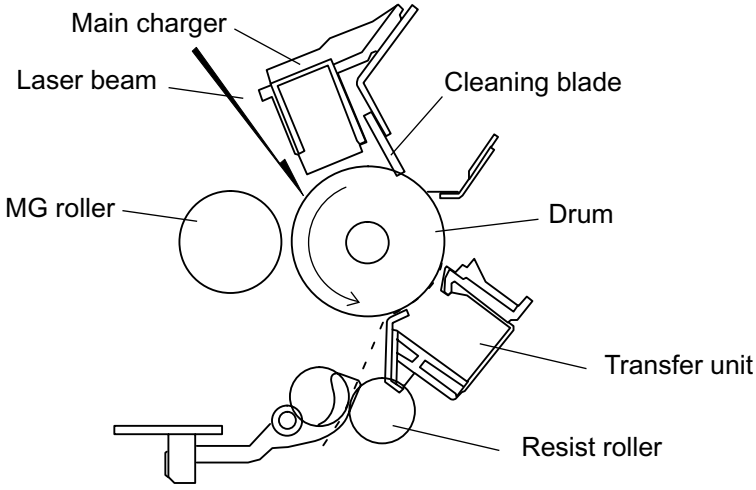
Pin No.	Signal name	Pin No.	Signal name
1	$\overline{\text{STB}}$	19	GND ($\overline{\text{STB}}$ RET)
2	DATA1	20	GND (DATA1 RET)
3	DATA2	21	GND (DATA2 RET)
4	DATA3	22	GND (DATA3 RET)
5	DATA4	23	GND (DATA4 RET)
6	DATA5	24	GND (DATA5 RET)
7	DATA6	25	GND (DATA6 RET)
8	DATA7	26	GND (DATA7 RET)
9	DATA8	27	GND (DATA8 RET)
10	$\overline{\text{ACKNLG}}$	28	GND ($\overline{\text{ACKNLG}}$ RET)
11	BUSY	29	GND (BUSY RET)
12	PE (Paper End)	30	GND (PE RET)
13	SLTC	31	INPRM
14	$\overline{\text{AUTO LF}}$	32	$\overline{\text{FAULT}}$
15	(NC)	33	(NC)
16	GND (0 V)	34	(NC)
17	FG	35	+5 V
18	+5 V	36	$\overline{\text{SLTC IN}}$

[6] COPY PROCESS

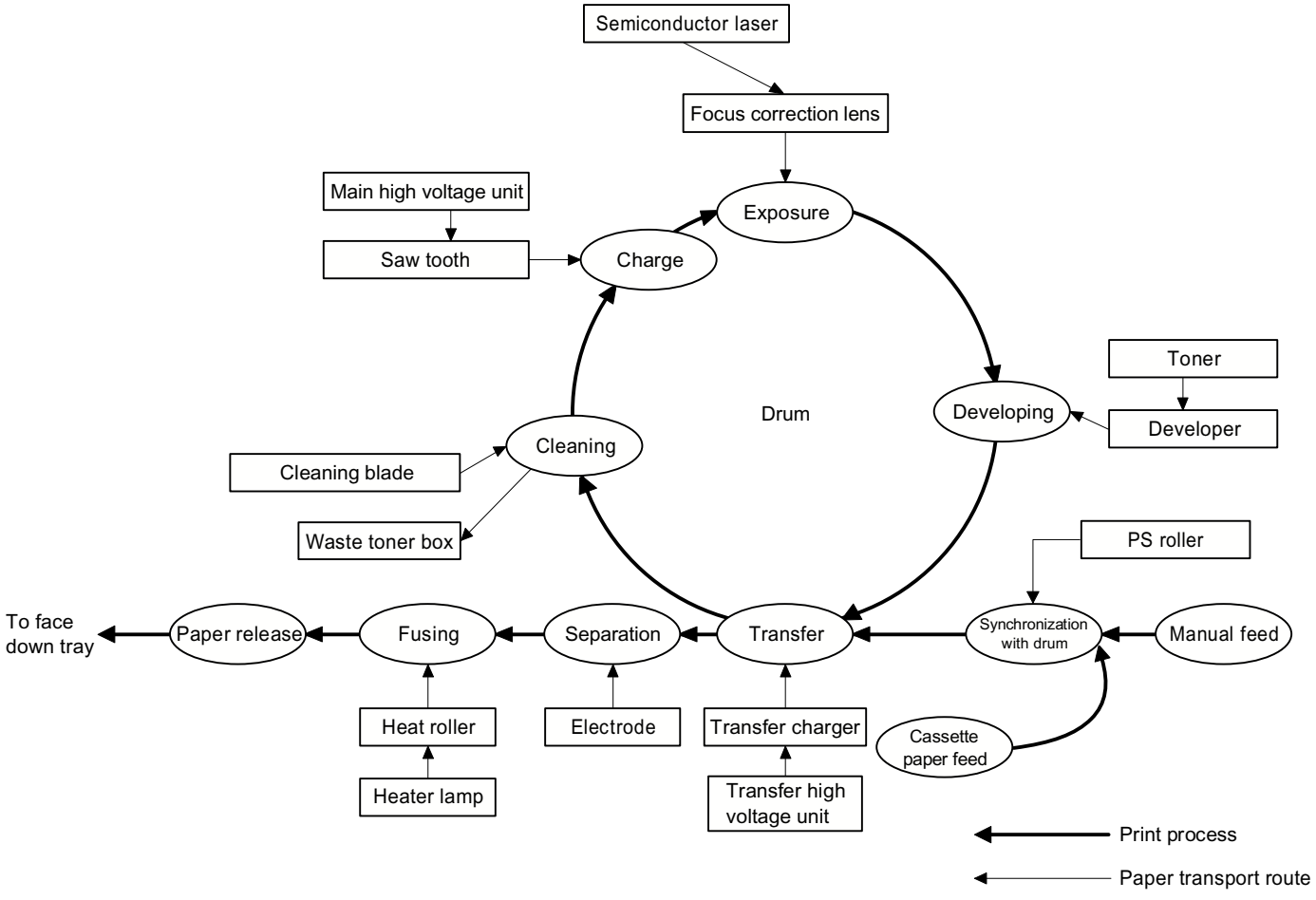
An OPC drum is used for the photoconductor.
(Structure of the OPC drum layers)



1. Functional diagram



(Basic operation cycle)



2. Outline of print process

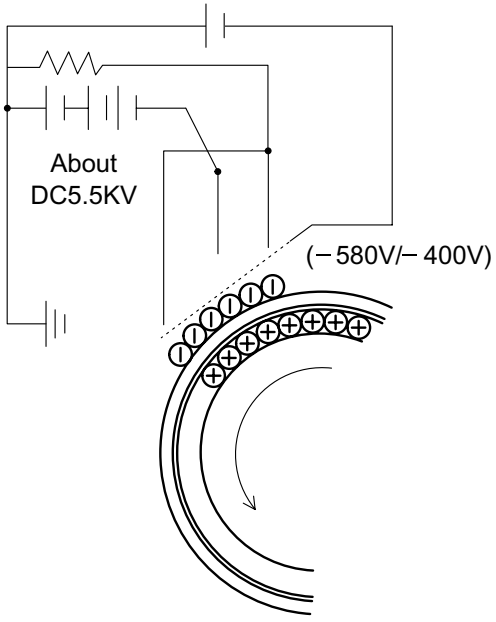
This printer is a non-impact printer that uses a semiconductor laser and electrostatic print process. This printer uses an OPC (Organic Photo Conductor) for its photoconductive material.
First, voltage from the main corona unit charges the drum surface and a latent image is formed on the drum surface using a laser beam. This latent image forms a visible image on the drum surface when toner is applied. The toner image is then transferred onto the print paper by the transfer corona and fused on the print paper in the fusing section with a combination of heat and pressure.

Step-1: Charge
Step-2: Exposure
* Latent image is formed on the drum.
Step-3: Developing
Latent image formed on the drum is then changed into visible image with toner.
Step-4: Transfer
The visible image (toner image) on the drum is transferred onto the print paper.
Step-5: Cleaning
Residual toner on the drum surface is removed and collected by the cleaning blade.
Step-6: Optical discharge
Residual charge on the drum surface is removed, by semiconductor laser beam.

3. Actual print process

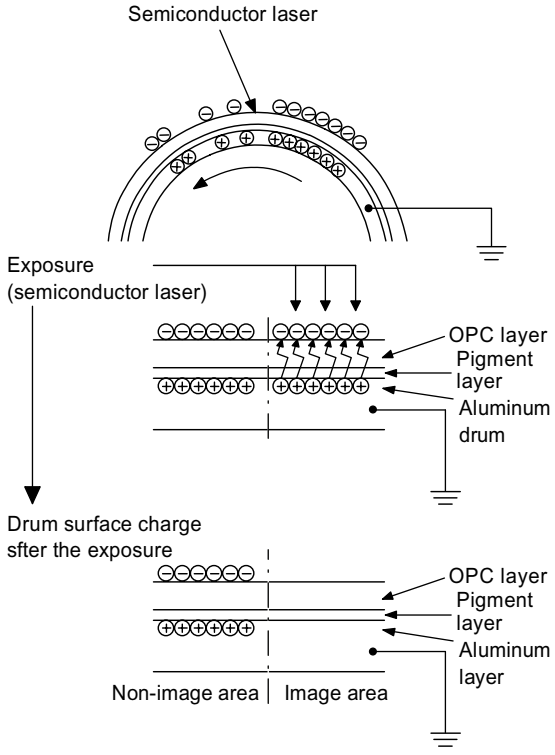
Step-1: DC charge

A uniform negative charge is applied over the OPC drum surface by the main charging unit. Stable potential is maintained by means of the Scorotron charger.
Positive charges are generated in the aluminum layer.



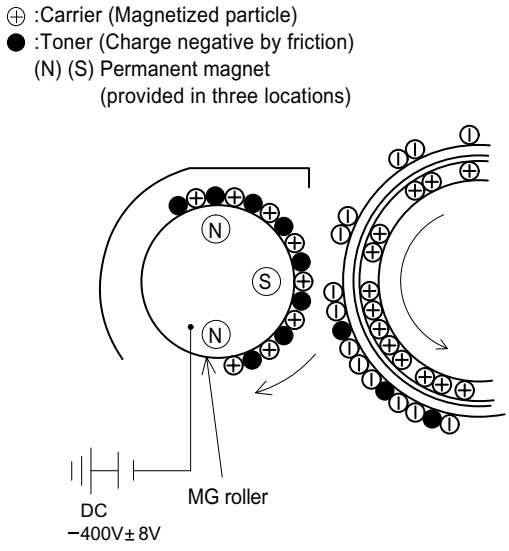
Step-2: Exposure (laser beam, lens)

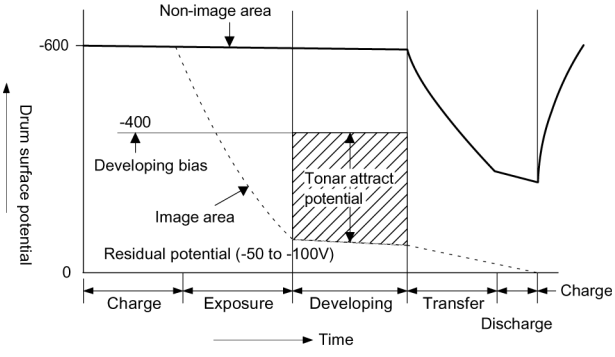
A Laser beam is generated from the semiconductor laser and controlled by the print pattern signal. The laser writes onto the OPC drum surface through the polygon mirrors and lens. The resistance of the OPC layer decreases for an area exposed by the laser beam (corresponding to the print pattern signal). The beam neutralizes the negative charge. An electrostatic latent image is formed on the drum surface.



Step-3: Developing (DC bias)

A bias potential is applied to the MG roller in the two component magnetic brush developing method, and the toner is charged negative through friction with the carrier.
Non-image area of the drum surface charged with negative potential repel the toner, whereas the laser exposed portions where no negative charges exist, attract the toner. As a result, a visible image appears on the drum surface.

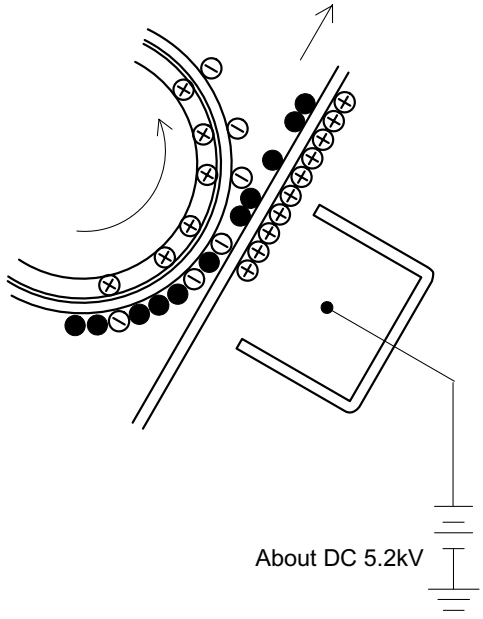




Toner is attracted over the shadowed area because of the developing bias.

Step-4: Transfer

The visible image on the drum surface is transferred onto the print paper by applying a positive charge from the transfer corona to the backside of the print paper.

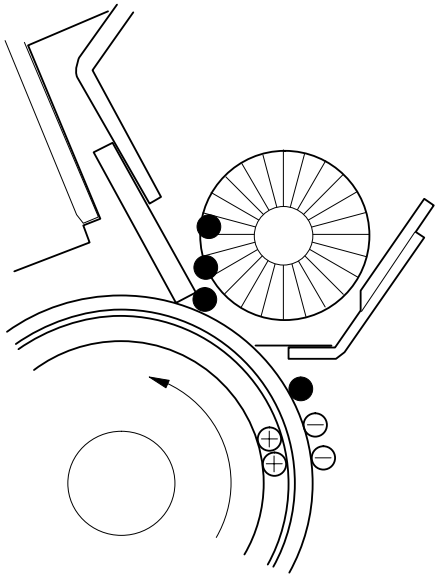


Step-5: Separation

Since the print paper is charged positively by the transfer corona, it is discharged by the separation corona. The separation corona is connected to ground.

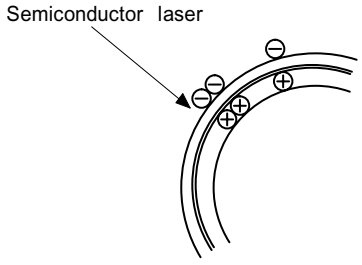
Step-6: Cleaning

Toner remaining on the drum is removed and collected by the cleaning blade. It is transported to the waste toner collecting section in the cleaning unit by the waste toner transport roller.



Step-7: Optical discharge (Semiconductor laser)

Before the drum rotation is stopped, the semiconductor laser is radiated onto the drum to reduce the electrical resistance in the OPC layer and elimate residual charge, providing a uniform state to the drum surface for the next page to be printed.
When the electrical resistance is reduced, positive charges on the aluminum layer are moved and neutralized with negative charges on the OPC layer.



Charge by the Scorotron charger

Function

The Scorotron charger functions to maintain uniform surface potential on the drum at all times, It control the surface potential regardless of the charge characteristics of the photoconductor.

Basic function

A screen grid is placed between the saw tooth and the photoconductor. A stable voltage is added to the screen grid to maintain the corona current on the photoconductor.
As the photoconductor is charged by the saw tooth from the main corona unit, the surface potential increases. This increases the current flowing through the screen grid. When the photoconductor potential nears the grid potential, the current turns to flow to the grid so that the photoconductor potential can be maintained at a stable level.

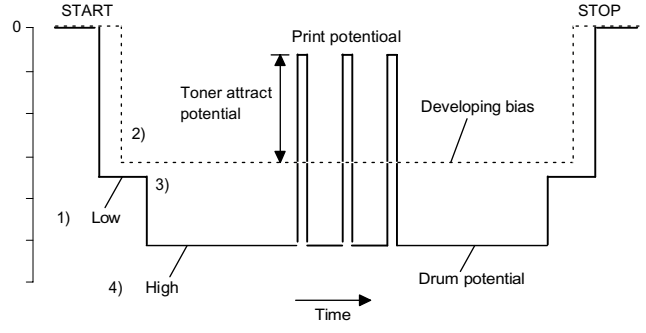
Process controlling

Function

The print pattern signal is converted into an invisible image by the semiconductor laser using negative to positive (reversible) developing method. Therefore, if the developing bias is added before the drum is charged, toner is attracted onto the drum. If the developing bias is not added when the drum is charged, the carrier is attracted to the drum because of the strong electrostatic force of the drum.
To avoid this, the process is controlled by adjusting the drum potential and the grid potential of the Scorotron charger.

Basic function

Voltage added to the screen grid can be selected, high and low. To make it easily understood, the figure below shows voltage transition at the developer unit.



Start

1) Because the grid potential is at a low level, the drum potential is at about -400V. (Carrier may not be attracted though the carrier is pulled towards the drum by the electrostatic force of -400V.
2) Developing bias (-400V) is applied when the photoconductor potential is switched from LOW to HIGH.
3) Once developing bias (-400V) is applied and the photo conductor potential rises to HIGH, toner will not be attracted to the drum.

Stop

The reverse sequence takes place.
Retaining developing bias at an abnormal occurrence

Function

The developing bias will be lost if the power supply was removed during print process. In this event, the drum potential slightly abates and the carrier makes deposits on the drum because of strong static power. To prevent this, the machine incorporates a function to retain the developing bias for a certain period and decrease the voltage gradually against possible power loss.

Basic function

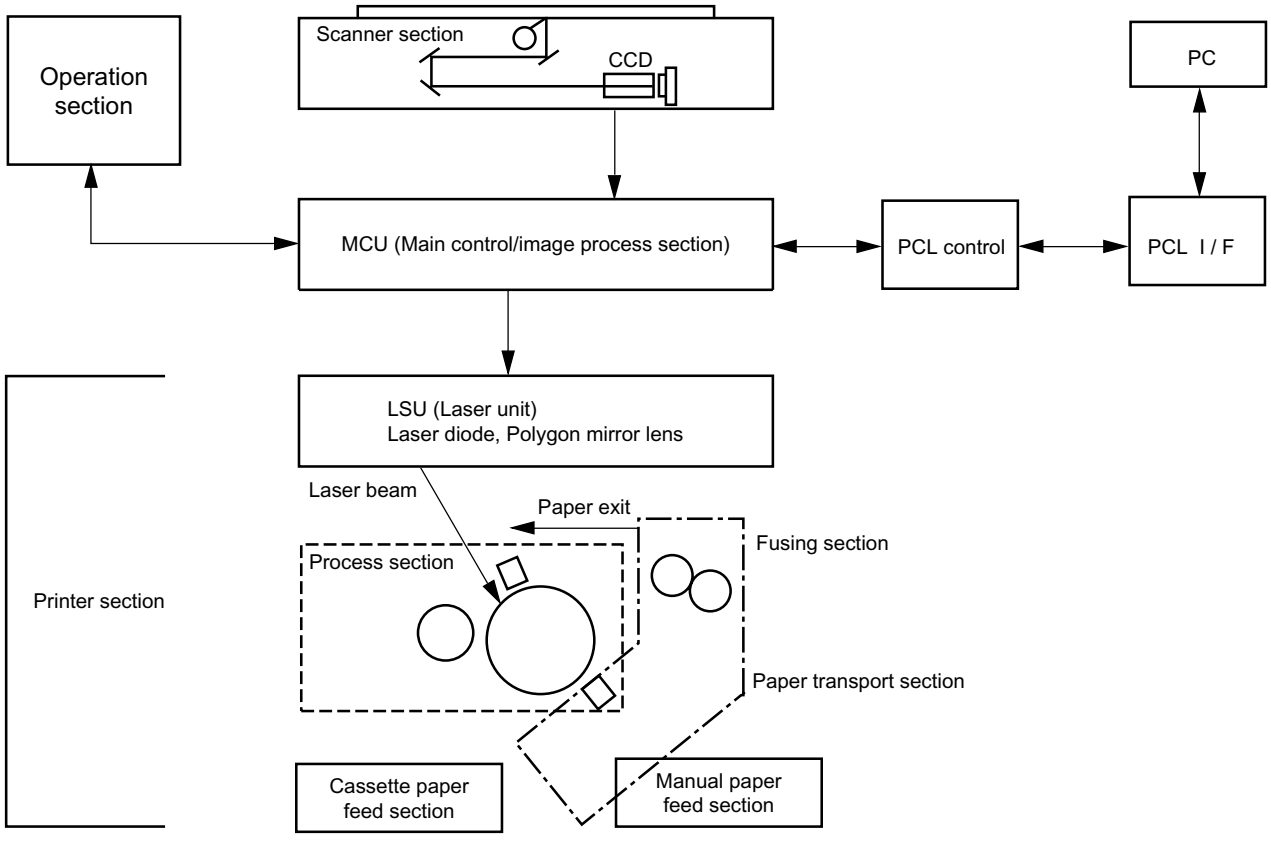
Normally, the developing bias voltage is retained for a certain time before the drum comes to a complete stop if the machine should stop before completing the normal print cycle. The developing bias can be added before resuming the operation after an abnormal interruption. Therfore, carrier will not make a deposit on the drum surface.

[7] OPERATIONAL DESCRIPTIONS

1. Outline of operation

The outline of operation is described referring to the basic configuration.

(Basic configuration)



(Outline of copy operation)

Setting conditions

1) Set copy conditions such as the copy quantity and the copy density with the operation section, and press the COPY button. The information on copy conditions is sent to the MCU.

Image scanning

2) When the COPY button is pressed, the scanner section starts scanning of images.
   The light from the copy lamp is reflected by the document and passed through the lens to the CCD.

Photo signal/Electric signal conversion

3) The image is converted into electrical signals by the CCD circuit and passed to the MCU.

Image process

4) The document image signal sent from the CCD circuit is processed under the revised conditions and sent to the LSU (laser unit) as print data.

Electric signal/Photo signal (laser beam) conversion

5) The LSU emits laser beams according to the print data.
   (Electrical signals are converted into photo signals.)
6) The laser beams are radiated through the polygon mirror and various lenses to the OPC drum.

Printing

7) Electrostatic latent images are formed on the OPC drum according to the laser beams, and the latent images are developed to be visible images(toner images).
8) Meanwhile the paper is fed to the image transfer section in synchronization with the image lead edge.
9) After the transfer of toner images onto the paper, the toner images are fused to the paper by the fusing section. The copied paper is discharged onto the exit tray.

2. Scanner section

A. How to scan documents

The scanner has sensors that are arranged in a line. These sensors scan a certain area of a document at a time and deliver outputs sequentially. When the line is finished, the next line is scanned, and this procedure is repeated.

The figure below shows the case where the latter two sections of an image which are scanned are shown with solid lines and the former two sections which are being transmitted are shown with dotted lines.

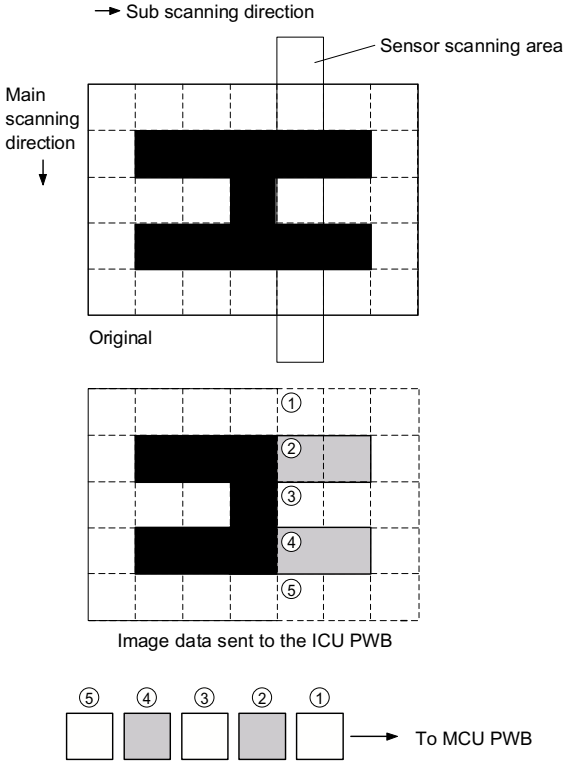
The direction of this line is called "main scanning direction," and the scanning direction "sub scanning direction."

In the figure below, one line is divided into 4 sections. Actually, however, one line is divided into thousands of sections. For scanning, the light receiving element called CCD is used.

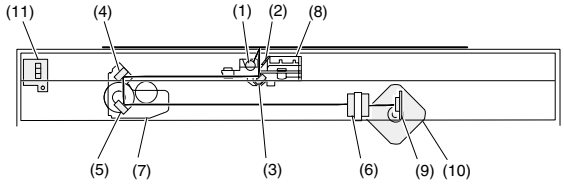
The basic resolution indicates the scanner capacity. The basic resolution is expressed in dpi (dot/inch) which shows the number of light emitting elements per inch on the document.

The basic resolution of this machine is 400dpi.

In the sub scanning direction, at the same time, the motor that drives the optical system is controlled to scan the image at the basic resolution.



B. Basic structure of scanner section



1	Copy lamp (Xenon lamp)	2	Reflector (light conversion plate)
3	No. 1 mirror	4	No. 2 mirror
5	No. 3 mirror	6	Lens
7	No. 2/3 mirror unit	8	Copy lamp unit
9	CCD	10	Mirror motor
11	MHPS (Mirror home position sensor)		

The scanner unit performs scanning in the digital optical system.

The light from the light source (Xenon lamp) is reflected by a document and passed through three mirrors and reduction lenses to the CCD element (image sensor) where images are formed. This system is known as the reduction image sensor system. Photo energy on the CCD element is converted into electrical signals (analog signals). (Photo-electric conversion). The output signals (analog signals) are converted into digital signals (A/D conversion) and passed to the MCU (main control/image process section). The resolution at that time is 400dpi.

The mirror unit in the scanner section is driven by the mirror motor.

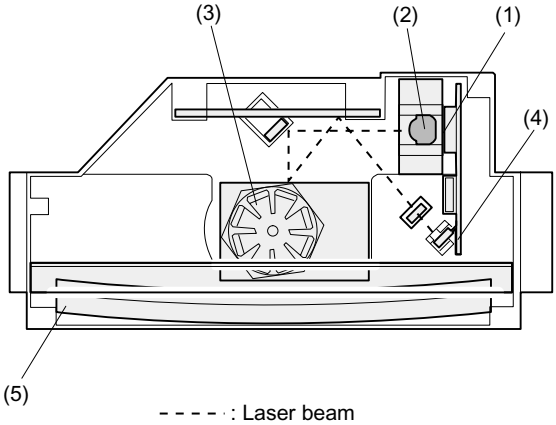
The MHPS is provided to detect the home position of the copy lamp unit.

3. Laser unit

The image data sent from the MCU (image process circuit) is sent to the LSU (laser unit), where it is converted into laser beams.

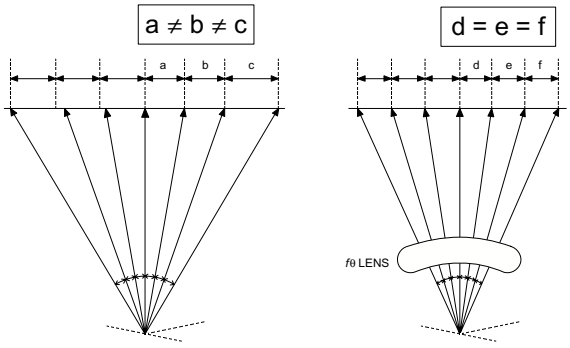
A. Basic structure

The LSU unit is the writing section of the digital optical system.
The semiconductor laser is used as the light source, and images are formed on the OPC drum by the polygon mirror and fθ lens, etc.
The laser beams are passed through the collimator lens, the cylindrical lens, the polygon mirror, the fθ lens, and the mirror to form images on the OPC drum in the main scanning direction. The laser emitting PWB is provided with the APC (auto power control) in order to eliminate fluctuations in the laser power. The BF PWB works for measurement of the laser writing start point.

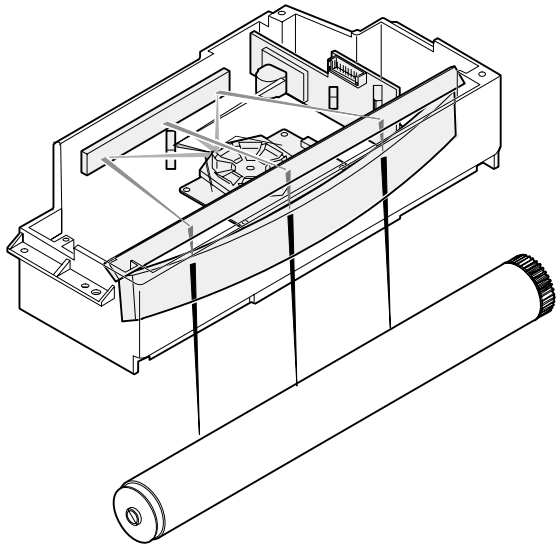


No	Component	Function
(1)	Semiconductor laser	Generates laser beams.
(2)	Collimator lens	Converges laser beams in parallel.
(3)	Polygon mirror, polygon motor	Reflects laser beams at a constant rpm.
(4)	BD (Mirror, lens, PWB)	Detects start timing of laser scanning.
(5)	fθ lens	Converges laser beams at a spot on the drum.
		Makes the laser scanning speeds at both ends of the drum same as each other. (Refer to the figure below.)

Makes the laser scanning speeds at both ends of the drum same as each other.



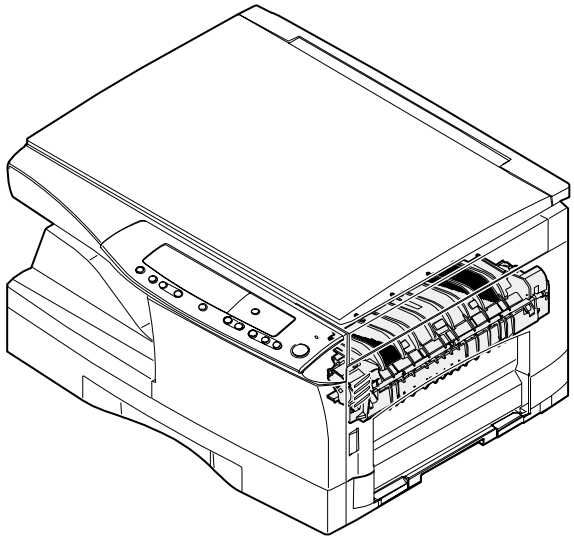
B. Laser beam path



C. Composition

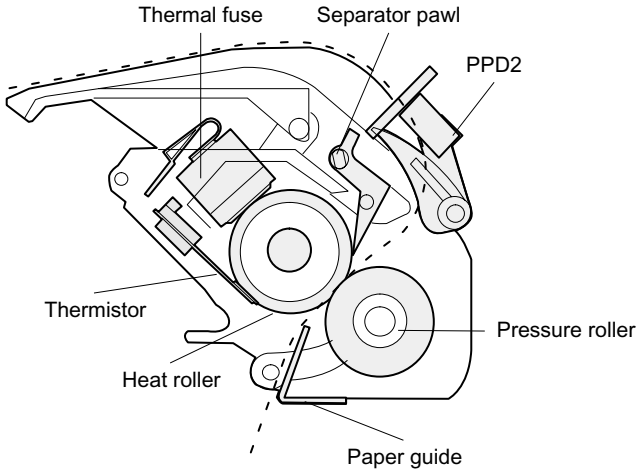
Effective scanning width:216mm (max.)
Resolution:600dpi
Beam diameter: 75um in the main scanning direction, 80um in the sub scanning direction
Image surface power:0.20 ±0.03mW (Laser wavelength 780 - 795nm)
Polygon motor section:Brushless motor 20.787rpm
No. of mirror surfaces:6 surfaces

4. Fuser section

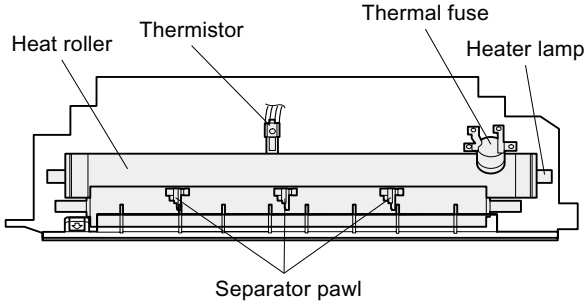


A. General description

General block diagram (cross section)



Top view



(1) Heat roller

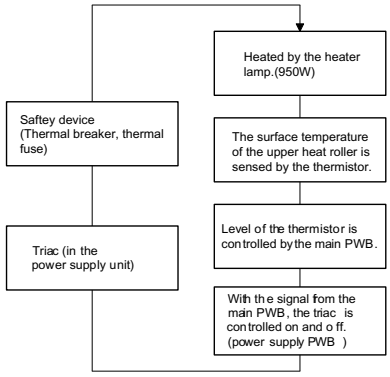
A teflon roller is used for the heat roller and a silicone rubber roller is used for the lower heat roller for better toner fusing performance and paper separation.

(2) Separator pawl

Three separator pawls are used on the upper heat roller. The separator pawls are teflon coated to reduce friction with the roller and prevent a smear on the paper caused by the separator pawl.

(3) Thermal control

1) The heater lamp, thermistor, main PWB, DC power supply PWB, and triac within the power supply unit are used to control the temperature in the fuser unit.
   To prevent against abnormally high temperature in the fuser unit, a thermal breaker and thermal fuse are used for safety purposes.


Heated by the heater lamp.(950W)
Saftey device (Thermal breaker, thermal fuse)
The surface temperature of the upper heat roller is sensed by the thermistor.
Level of the thermistor is controlled by the main PWB.
Triac (in the power supply unit)
With the signal from the main PWB, the triac is controlled on and off. (power supply PWB)

2) The surface temperature of the upper heat roller is set to 165 - 190°C. The surface temperature during the power save mode is set to 100°C.
3) The self-check function comes active when one of the following malfunctions occurs, and an "H" is displayed on the multicopy window.

a. When the heat roller surface temperature rises above 240°C.
b. When the heat roller surface temperature drops below 100°C during the copy cycle.
c. Open thermistor
d. Open thermal fuse
e. When the heat roller temperature does not reach 190°C within 27 second after supplying the power.

(4) Fusing resistor

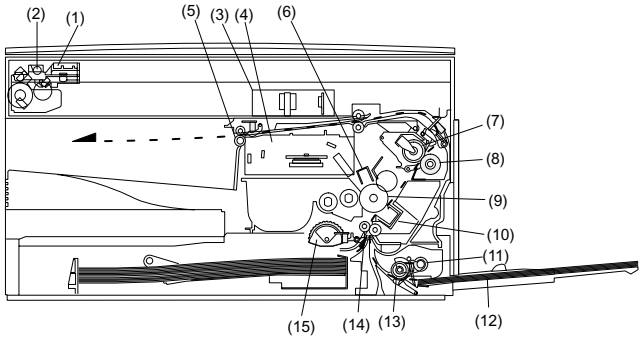
Fusing resistor

This model is provided with a fusing resistor in the fusing section to improve transfer efficiency.

Since the upper heat roller is conductive, when using copy paper that contains moisture and the distance between the transfer unit and the fusing unit is short, the transfer current may find a path to ground via the copy paper, the upper heat roller and the discharging brush.

5. Paper feed section and paper transport section

A. Paper transport path and general operations



(1)	Scanner unit	(9)	Drum
(2)	Copy lamp	(10)	Transfer unit
(3)	Lens unit	(11)	Pickup roller
(4)	LSU (Laser unit)	(12)	Manual paper feed tray
(5)	Paper exit roller	(13)	Manual paper feed roller
(6)	Main charger	(14)	PS roller unit
(7)	Heat roller	(15)	Paper feed roller
(8)	Pressure roller		

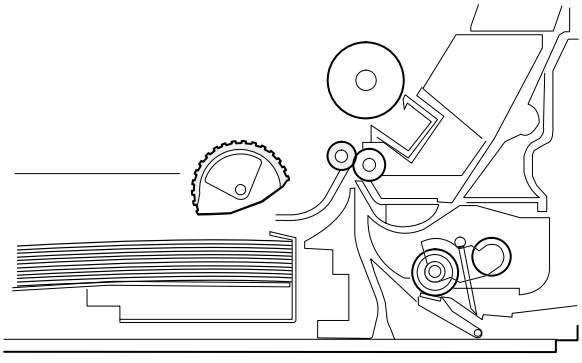
Paper feed is made in two ways; the tray paper feed and the manual paper feed. The tray is of universal-type, and has the capacity of 250 sheets.

The front loading system allows you to install or remove the tray from the front cabinet.

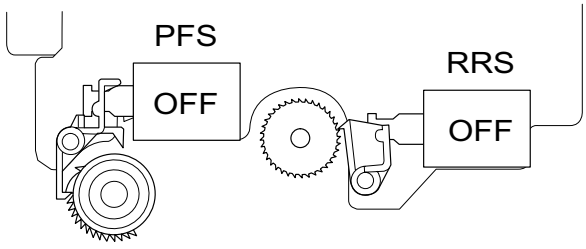
The general descriptions on the tray paper feed and the manual paper feed operation are given below.

(1) Cassette paper feed operation

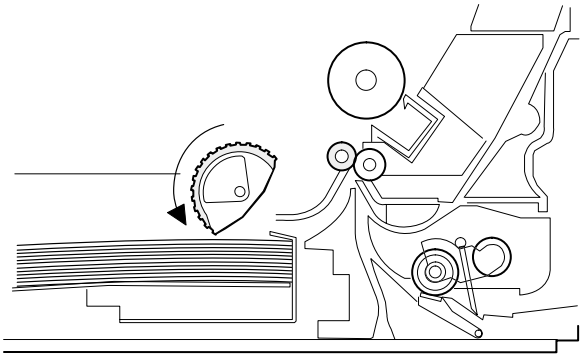
1) The figure below shows the positions of the pick-up roller, the paper feed clutch sleeve, and the paper feed latch in the initial state without pressing the COPY button after lighting the ready lamp.
   The paper feed latch is in contact with the projection of the clutch sleeve.

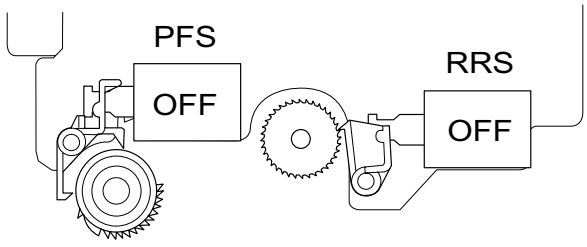


2) When the COPY button is pressed, the main drive motor starts rotating to drive each drive gear.
   The pick-up drive gear also is driven at that time. Since, however, the paper feed latch is in contact with the projection of the clutch sleeve, rotation of the drive gear is not transmitted to the pick-up roller, which does not rotate therefore.



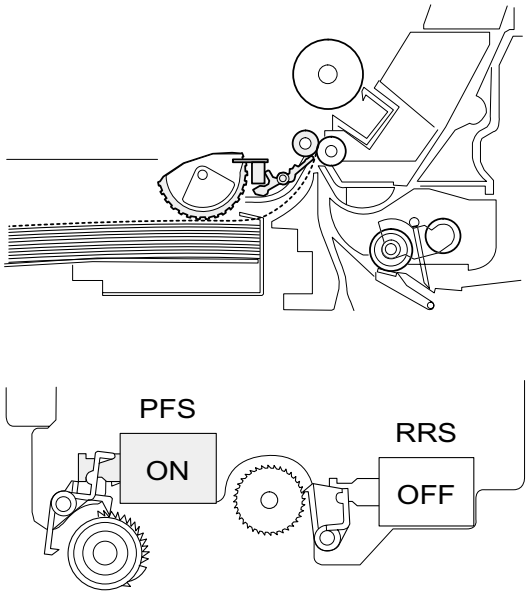
3) After about 0.1 sec from when the main motor start rotating, the tray paper feed solenoid (PFS) turns on for a moment.
   This disengages the paper feed latch from the projection of the clutch sleeve, transmitting rotation of the pick-up drive gear to the paper feed roller shaft, rotating the pick-up roller to feed the paper.



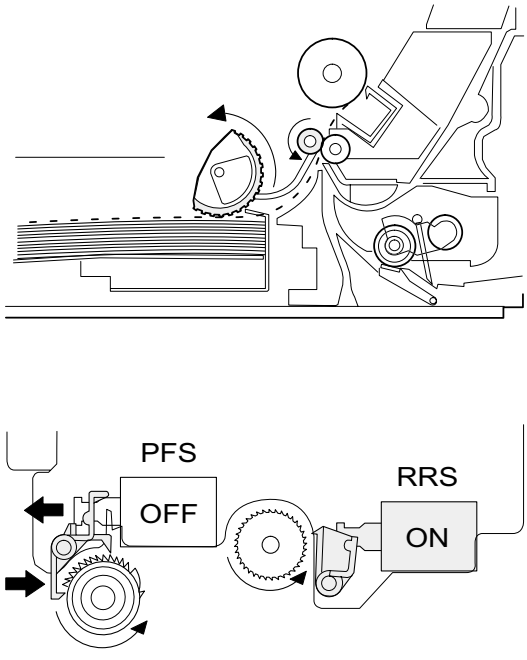


4) After more than half rotation of the pick-up roller, the paper feed latch is brought in contact with a notch on the clutch sleeve, stopping rotation of the pick-up roller.

5) At this time, the paper is fed passed the paper entry detection switch (PPD1), and detected by it. After about 0.15 sec from detection of paper by PPD1, the tray paper feed solenoid (PFS) turns on so that the clutch sleeve projection comes into contact with the paper feed latch to stop the pick-up roller. Then the pick-up roller rotates for about 0.15 sec so that the lead edge of the paper is evenly pressed on the resist roller, preventing against skew feeding.



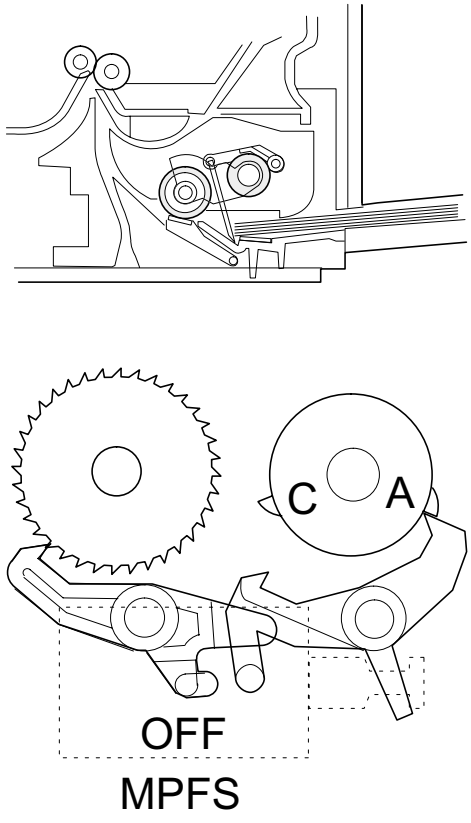
6) To release the resist roller, the tray paper feed solenoid and the resist solenoid are turned on by the paper start signal to disengage the resist start latch from the clutch sleeve, transmitting rotation of the resist drive gear to the resist roller shaft. Thus the paper is transported by the resist roller.
7) After the resist roller starts rotating, the paper is passed through the pre-transfer guide to the transfer section. Images are transferred on the paper, which is separated from the OPC drum by the drum curve and the separation section.



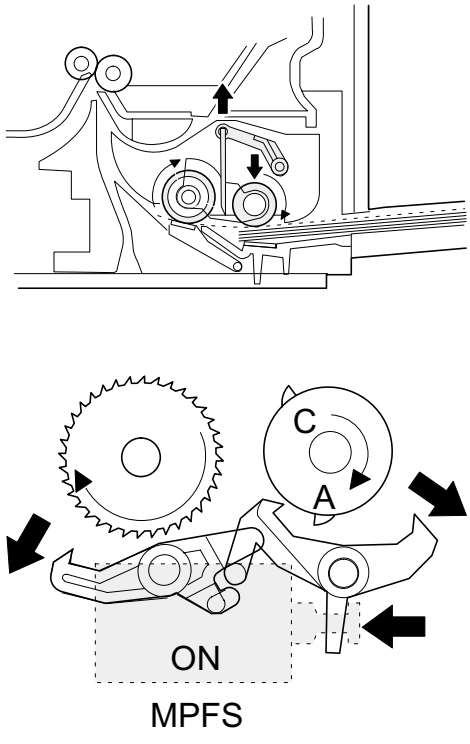
8) The paper separated from the drum is passed through the fusing paper guide, the heat roller (fusing section), POD (paper out detector) to the copy tray.

(2) Manual multi paper feed operation

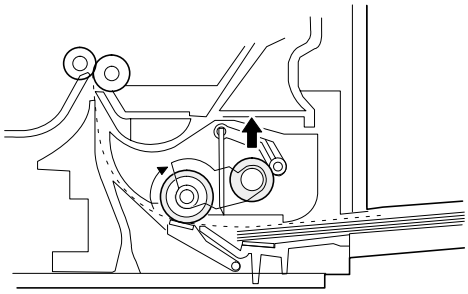
1) Before paper feed operation, the manual paper feed solenoid (MPFS) is turned OFF as shown in the figure below.

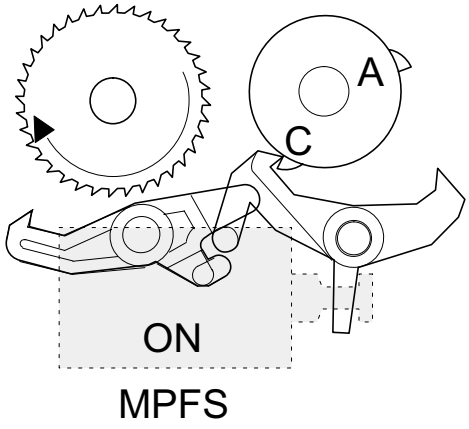


2) When the PRINT button is pressed, the manual paper feed solenoid (MPFS) turns on to disengage the manual paper feed latch.
A from the manual paper feed clutch sleeve A, rotating the manual paper feed roller and the manual take-up roller. At the same time, the manual paper feed stopper opens and the manual take-up roller is pressed to the surface of the paper to start paper feeding.

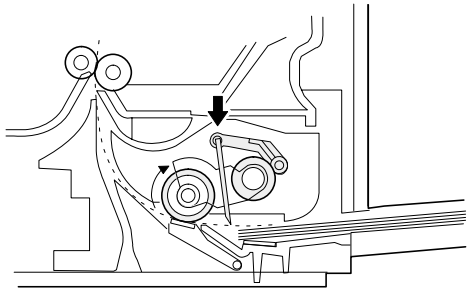


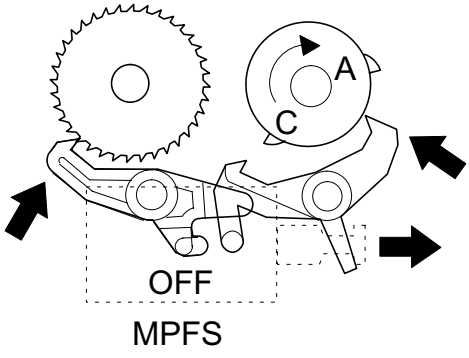
3) When pawl C of the manual paper feed clutch sleeve is engaged with the manual feed latch, the manual feed stopper falls and the manual take-up roller rises. At that time, the manual paper feed roller is rotating.





4) The lead edge of the transported paper is pressed on the resist roller by the transport roller. Then the paper is stopped temporarily to allow synchronization with the lead edge of the image on the OPC drum. From this point, the operation is the same as the paper feed operation from the tray. (Refer to A-5 - 8.)
5) The solenoid turns off to close the gate and return to the initial state.





(3) Conditions of occurrence of paper misfeed

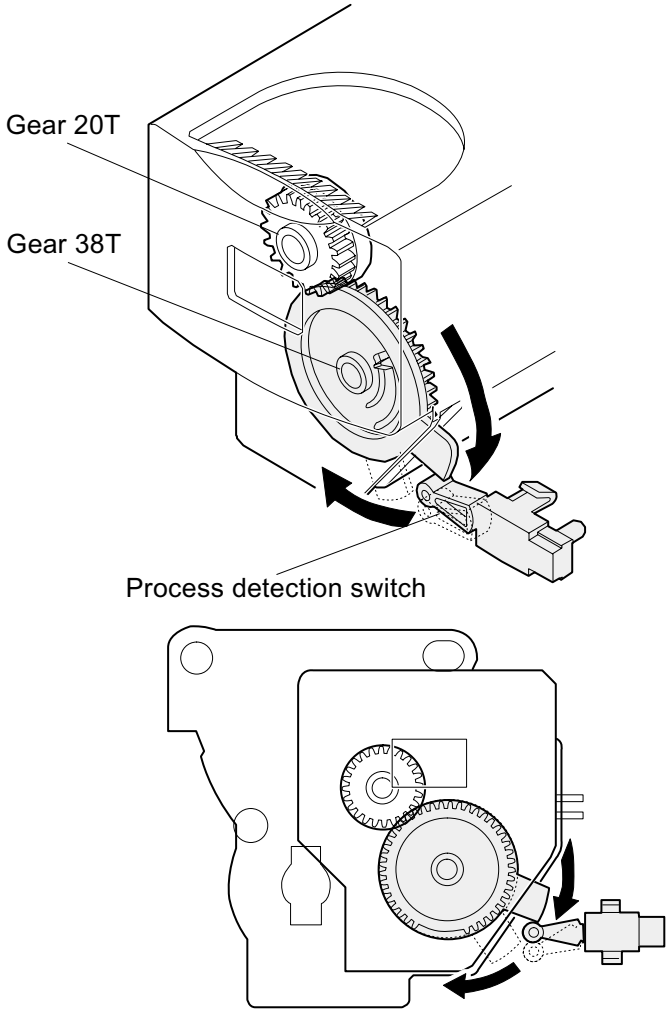
a. When the power is turned on:
PPD or POD is ON when the power is turned on.

b. Copy operation

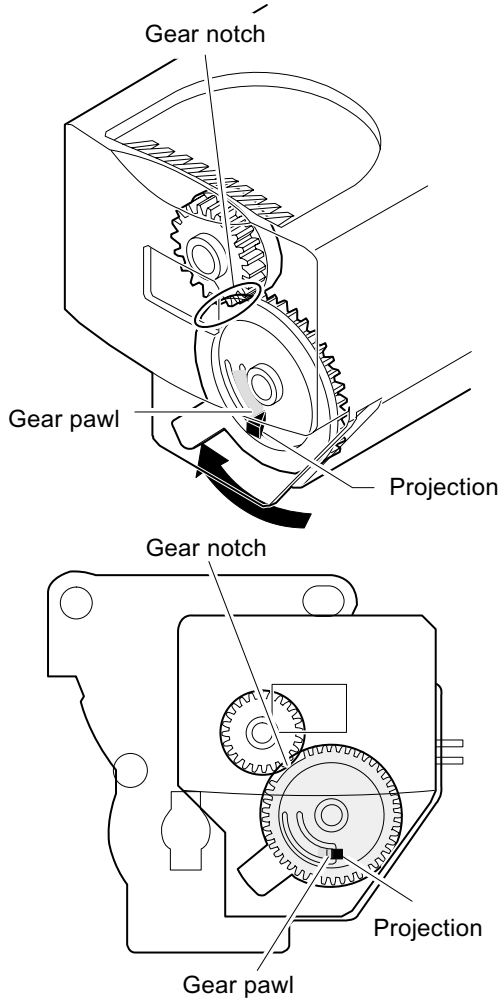
a	PPD1 jam	PPD1 does not turn off within 4 sec after turning on the resist roller.
b	PPD2 jam	PPD2 is off immediately after turning on the resist roller.
		PPD2 does not turn off within 1.2 sec after turning off the resist roller.
c	POD jam	POD does not turn on within 2.9 sec after turning on the resist roller.
		POD does not turn off within 1.5 sec - 2.7 sec after turning off PPD2.

6. Process unit new drum detection mechanism

1) When the power is turned on, the detection gear 38T is rotated in the arrow direction by the detection gear 20T to push the microswitch (process detection switch) installed to the machine sensor cover, making a judgement as a new drum.



2) When the detection gear 38T turns one rotation, there is no gear any more and it stops.
The latch section of the 38T gear is latched and fixed with the projection of the process cover.

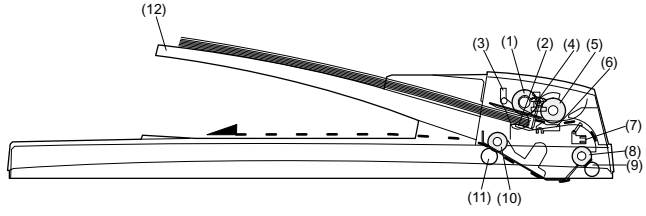


7. SPF section

A. Outline

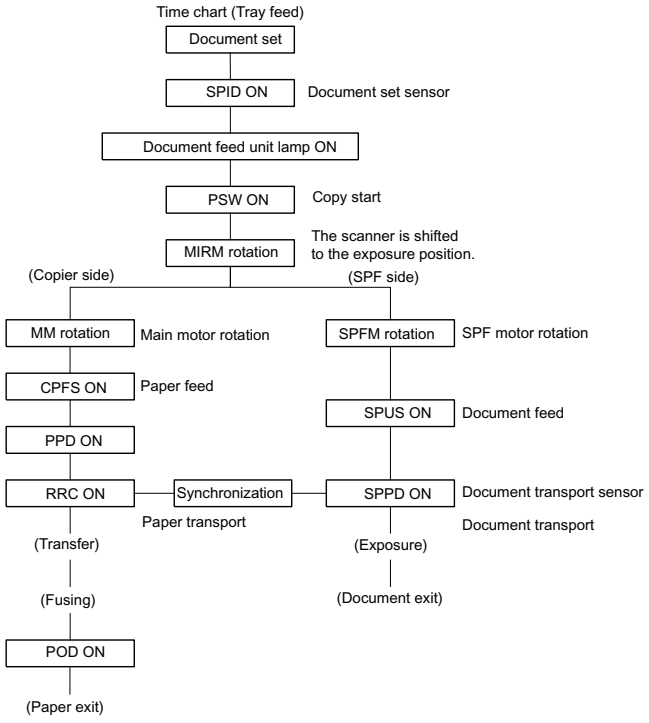
The SPF (Single Path Feeder) is installed to the AL-1451 as a standard provision, and it automatically copies up to 30 sheets of documents of a same size. (Only one set of copies)

B. Document transport path and basic composition

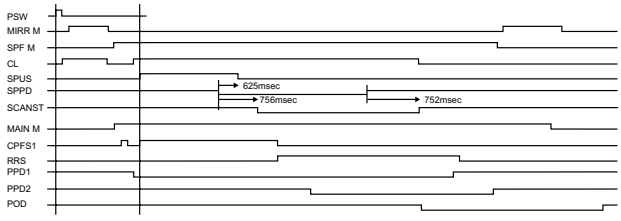


(1)	Pickup roller	(2)	Sheet of document for paper feed
(3)	Set detection ACT	(4)	Paper stopper
(5)	Document feed roller	(6)	Separation sheet
(7)	Paper entry sensor	(8)	PS roller D
(9)	Transport follower roller	(10)	Paper exit roller
(11)	Paper exit follower roller	(12)	Document tray

C. Operational descriptions



In the zooming mode, the magnification ratio in the sub scanning direction (paper transport direction) is adjusted by changing the document transport speed.



D. Cases where a document jam is caused

1) When SPPD is ON (document remaining) when the power is turned on.
2) When SPPD is not turned ON within about 1.5 sec (at 100% copy) after starting the document feed operation.
3) When SPPD is not turned on within about 4.7 sec (at 100% copy) after turning on SPPD.
4) When the SPF document jam release door or the OC cover is opened during document transport (SPF motor rotating).

8. D-D (Duplex to Duplex) mode paper/ document transport (Duplex model)

A. Initial state

Set duplex documents on the document tray.
Set paper on the cassette. (In the duplex mode, the manual feed tray cannot be selected.)

B. Front copy

Document transport:

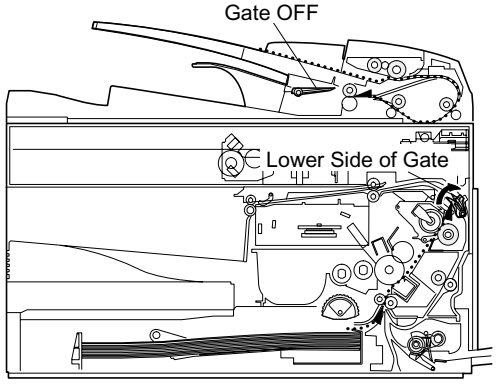
The document feed roller feeds the document from the paper feed roller to the PS roller.

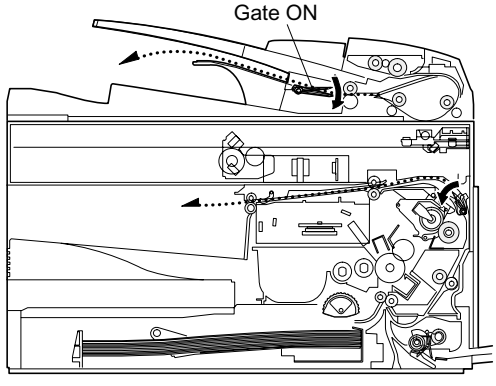
- The document is exposed in the exposure section, and sent to the document exit section
- by the transport/paper exit roller.
- R-SPF gate solenoid ON
- The document is sent to the intermediate tray. (but not discharged completely.)
- The document is stopped once, then switchback operation is performed. (To the back copy)

Paper transport:

The document is passed through the paper feed roller and the PS roller by the paper feed roller
and the images on the front surface are transferred.

- The paper is passed through the fusing section and the lower side of the gate section to the paper exit tray side, (but not discharged completely.)
- It is stopped once and switchback operation is performed. (To the back copy)





C. Back copy

Document transport:

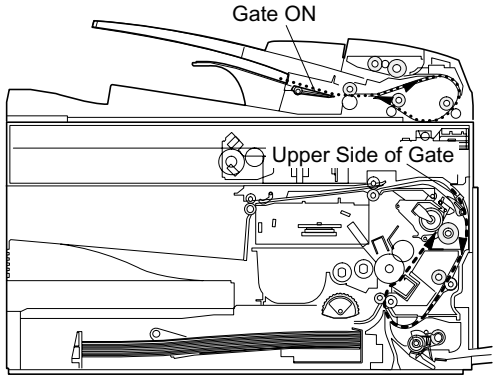
By switchback operation, the document is sent through the PS roller to the exposure section, where the back of the document is exposed.

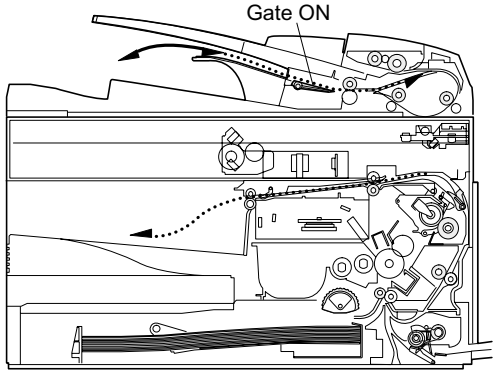
- It is sent to the document exit section by the transport roller and the paper exit roller.
- R-SPF gate solenoid ON. The document is sent to the intermediate tray, (but not discharged completely.)
- It is stopped once and switchback operation is performed.
- It is sent through the PS roller and the exposure section (without exposure operation) to the document exit section.
- R-SPF gate solenoid OFF
- The document is discharged to the document exit tray.

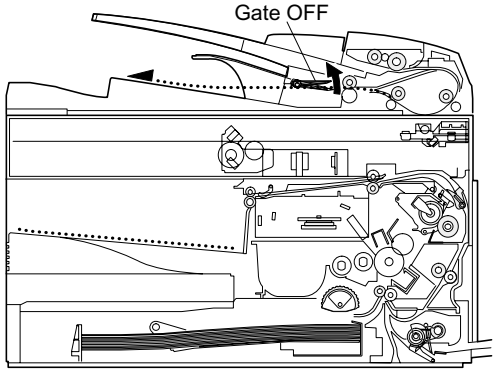
Paper transport:

Switchback operation is performed.

- The paper is sent through the upper side of the gate section and the duplex transport section, and the PS roller, and the images on the back are transferred.
- It is sent through the fusing section and discharged to the paper exit tray.







Switchback operation is made after back copying in order to discharge documents according to the setting.

Set document Documents after discharge,

$\frac{1}{2}$ with empty feed $\frac{4}{3}$ without empty feed $\frac{3}{4}$

$\frac{3}{4}$ $\frac{2}{1}$ $\frac{1}{2}$

There are following job modes as well as D-D mode.

S - S (Simplex to Simplex)

S - D (Simplex to Duplex),

Rotation copy mode (The back images are rotated 180°C.)

S - D (Simplex to Duplex), Copy mode without rotation

D - S (Duplex to Simplex)

Rotation copy mode:

The front and the back are in upside down each other.

Copy mode without rotation:

The front and the back are not in upside down.

[8] DISASSEMBLY AND ASSEMBLY

Before disassembly, be sure to disconnect the power cord for safety.
The disassembly and assembly procedures are described for the following sections:

1. High voltage section
2. Operation panel section
3. Optical section
4. Fusing section
5. Tray paper feed/transport section
6. Manual paper feed section
7. Rear frame section
8. Power section
9. SPF section
10. 2nd cassette section
11. Duplex motor section
12. Reverse roller section
13. RSPF section

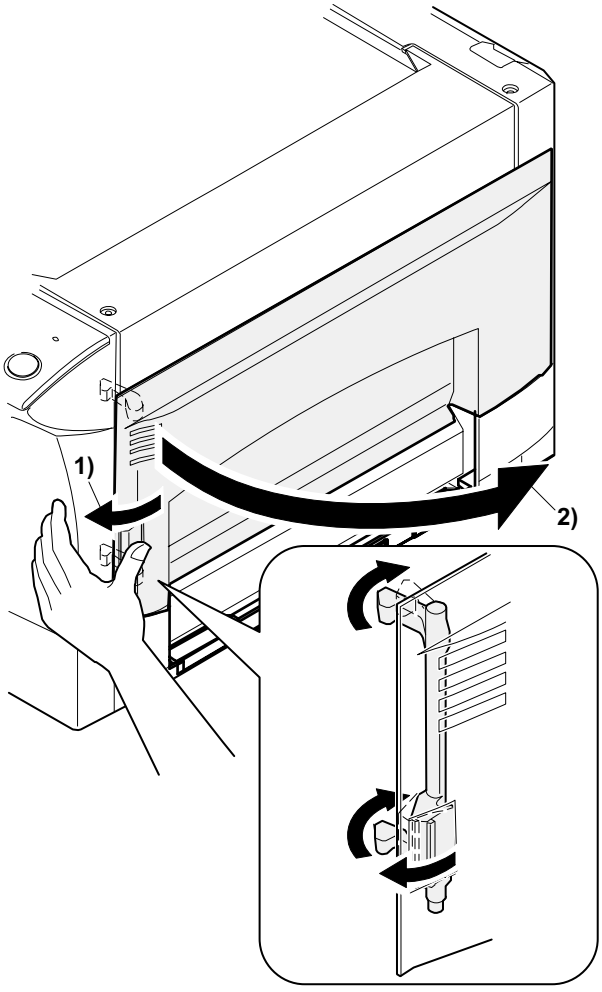
1. High voltage section

A. List

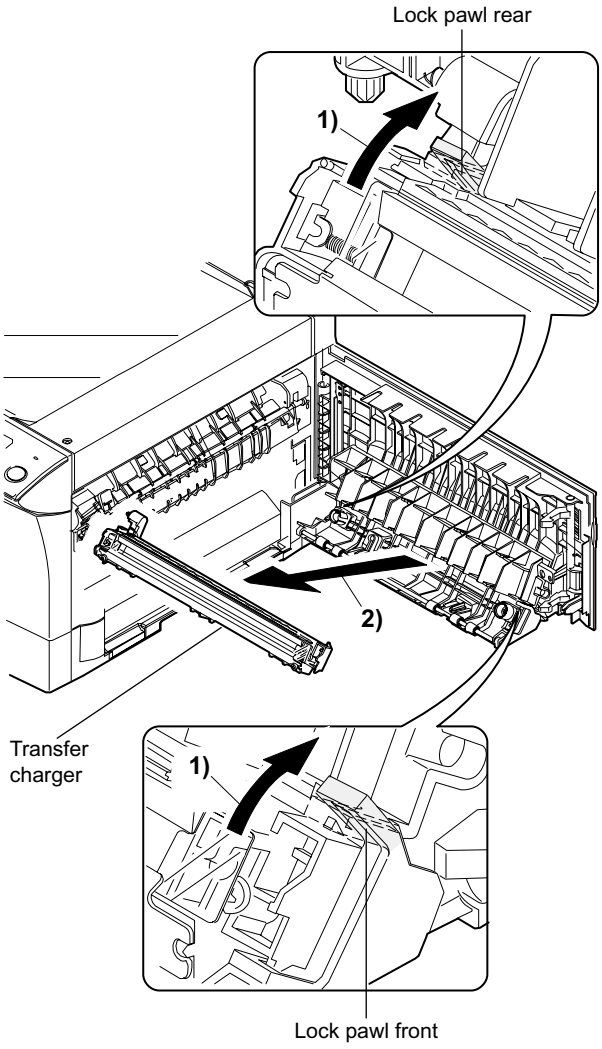
No.	Part name Ref.
1	Transfer charger unit
2	Charger wire

B. Disassembly procedure

1) Press the side cover open/close button and open the side cover.



2) Push up the lock pawls (2 positions) of the side cover, and remove the transfer charger.

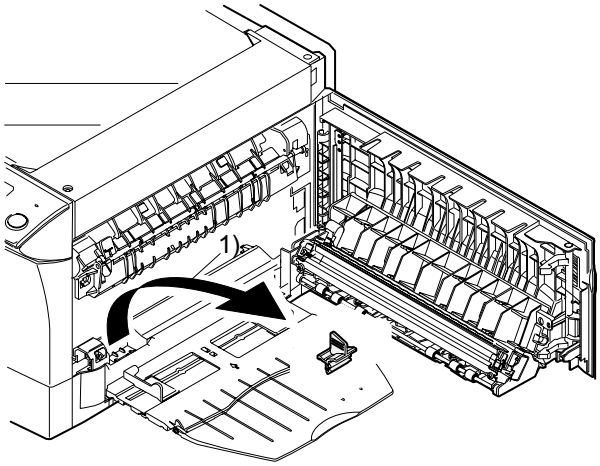


C. Assembly procedure

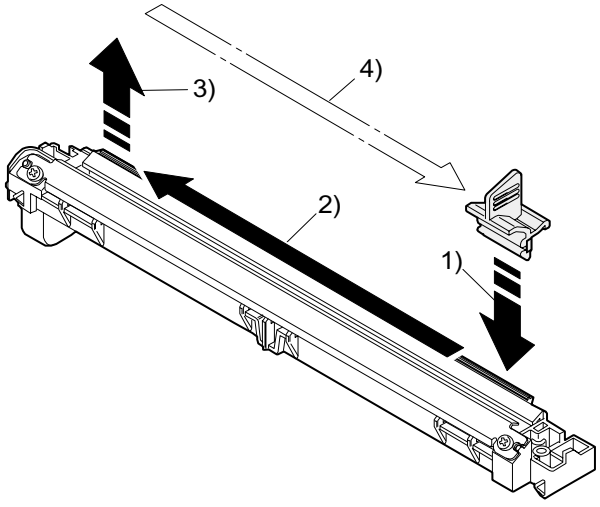
For assembly, reverse the disassembly procedure.

D. Charger wire cleaning

1) Remove the charger cleaner from the manual paper feed unit.



2) Set the charger cleaner to the transfer unit, and move it reciprocally a few times in the direction of the arrow shown in the figure below.



E. Charger wire replacement

1) Remove the TC cover and remove the screw.
2) Remove the spring and remove the charger wire.
3) Install a new charger wire by reversing the procedures (1) and (2). At that time, be careful of the following items.

•The rest of the charger wire must be within 1.5mm. Refer to Fig.1

•The spring hook section (charger wire winding section) must be in the range of the projection section.

•Be careful not to twist the charger wire.

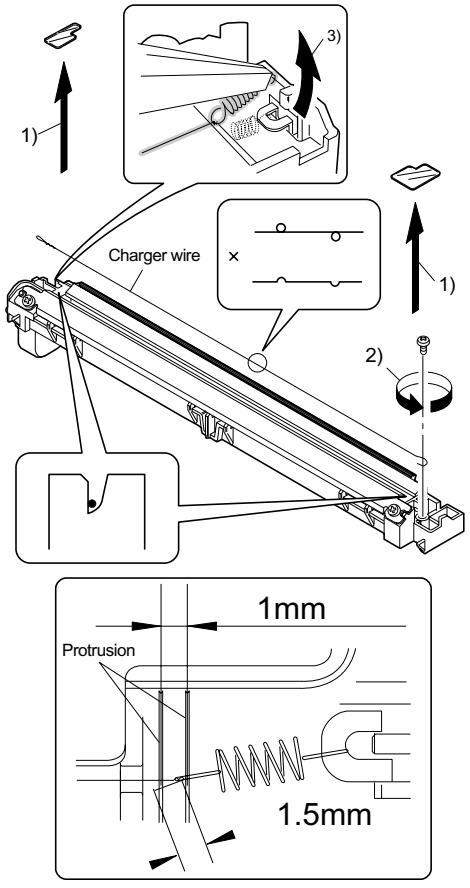


Fig.1

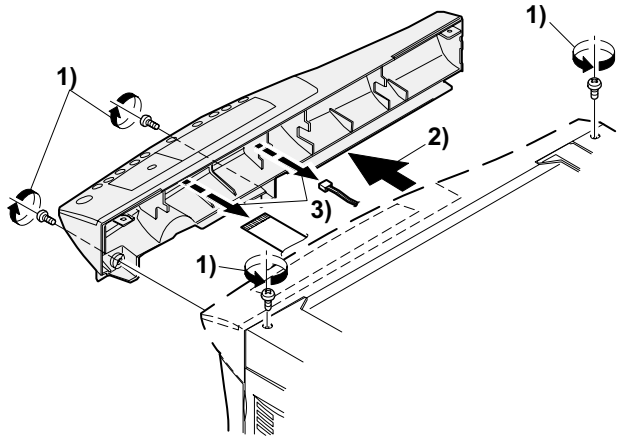
2. Operation panel section

A. List

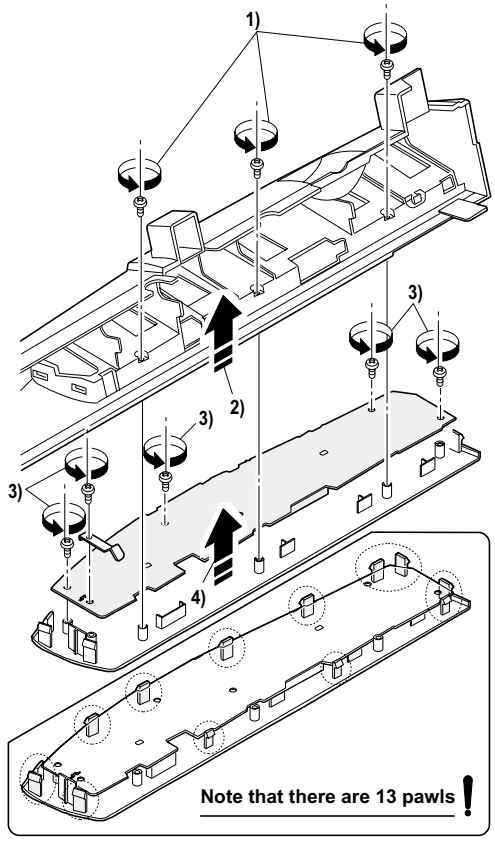
No.	Part name Ref.
1	Operation panel unit
2	Operation PWB

B. Disassembly procedure

1) Remove the screws (4 pcs.), the harness, and the operation panel unit.



2) Remove the screws (3 pcs.) and the PWB holder.
3) Remove the screws (3 pcs.) and the operation PWB.



C. Assembly procedure

For assembly, reverse the disassembly procedure

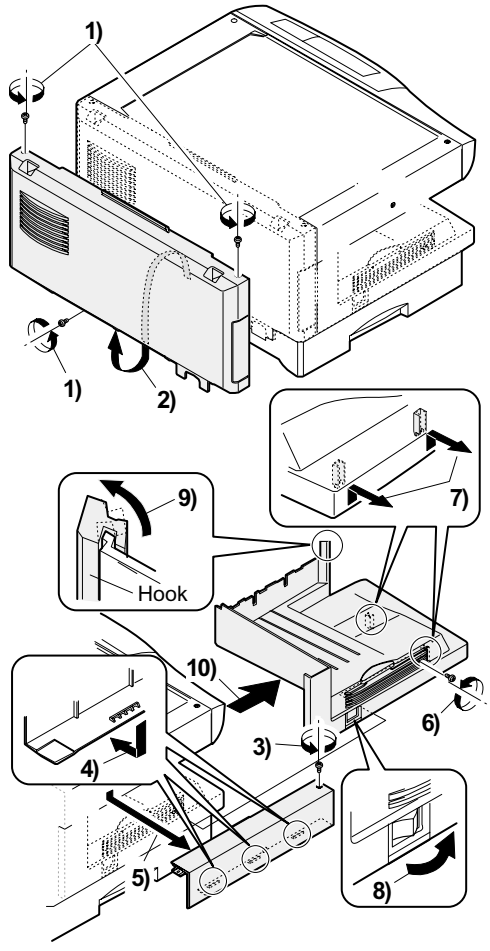
3. Optical section

A. List

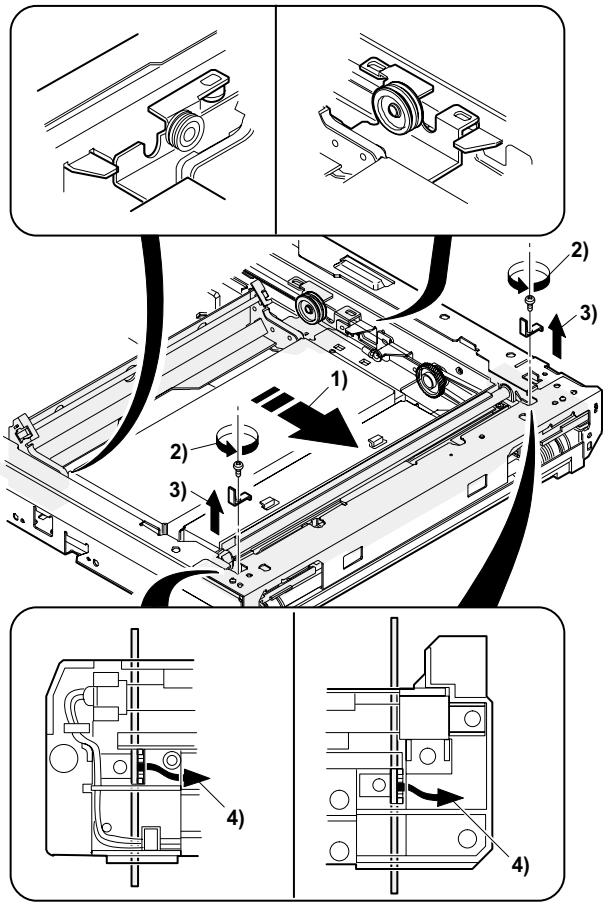
NO.	Part name Ref.
1	Copy lamp unit
2	Copy lamp
3	Lens unit

B. Disassembly procedure

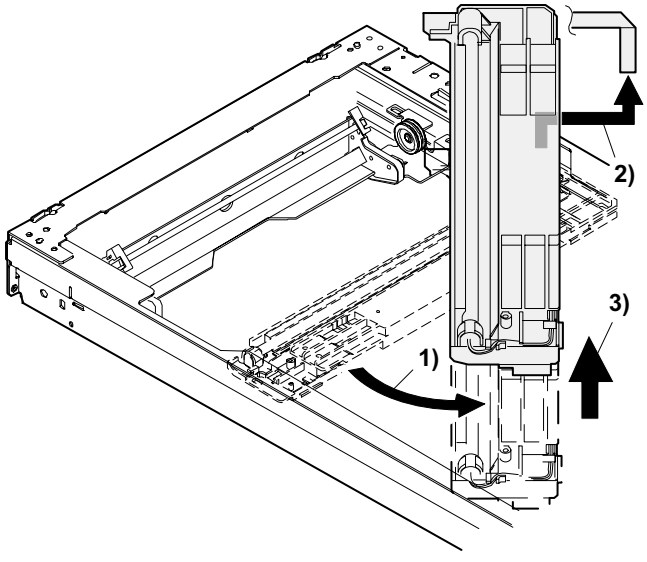
1) Remove the parts as shown below.



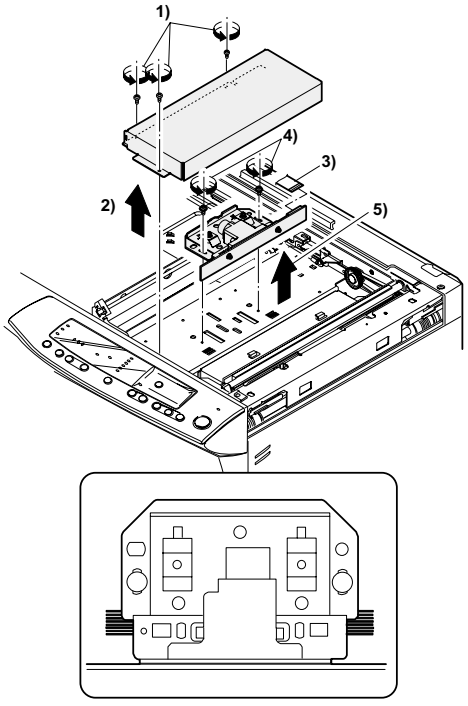
2) Remove the screws (2pcs.), and remove the copy lamp unit from the mirror base drive wire.



3) Pull the copy lamp unit toward you to remove the harness.



4) Remove the screw (4 pc) and remove the cover.
5) Remove the screws (2 pcs.), the harness, and the optical unit.



When installing the lens unit, refer to "8-6. Lens unit installation reference."

C. Assembly procedure

Basically reverse the disassembly procedure.
The mirror base drive wire and the lens drive wire stretching methods are described below in Fig.2.

a. Mirror base drive wire stretching

1) Hook the metal fixture of the mirror base drive wire on the projection of the optical base plate.
2) Pass the wire through the external groove of the double pulley.
(At that time, check that No. 2/3 mirror unit is in contact with the mirror base positioning plate.)
3) Hold so that the winding pulley groove is up, and wind the mirror base drive wire 9 turns.
4) Put the 8th turn of the mirror base drive wire in the winding pulley groove and fix with a screw.
5) Pass the wire under Mo. 2/3 mirror unit plate and wind it around pulley A.
6) Pass the wire through the internal groove of the double pulley, and pass through pulley B.
7) Hook the spring hook on the optical base plate.

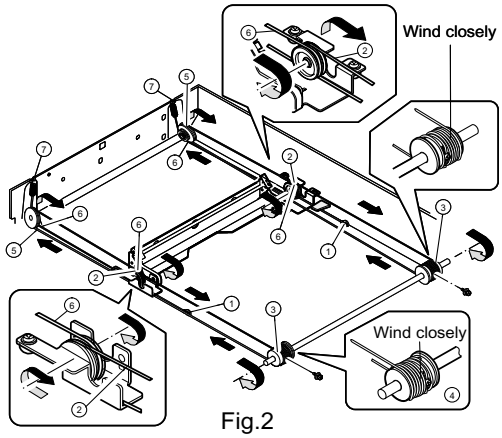


Fig.2

After installing the mirror base drive wire, be sure to perform main scanning direction image distortion adjustment.

4. Fusing section

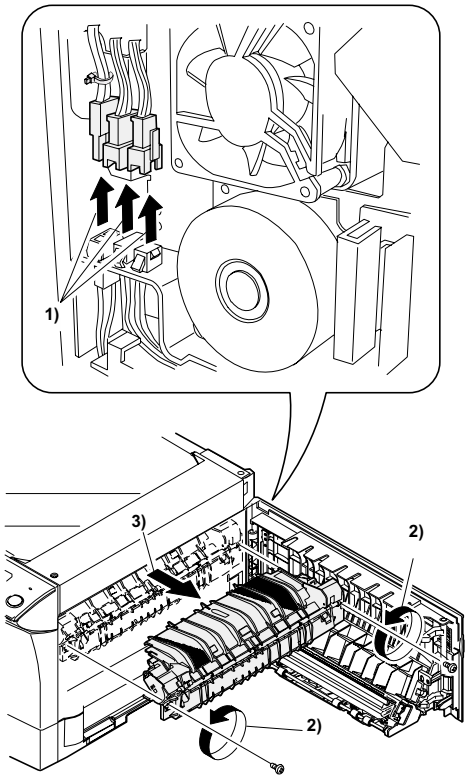
A. List

No.	Part name Ref.
1	Thermistor
2	PPD2 sensor
3	Heater lamp
4	Pressure roller
5	Heat roller

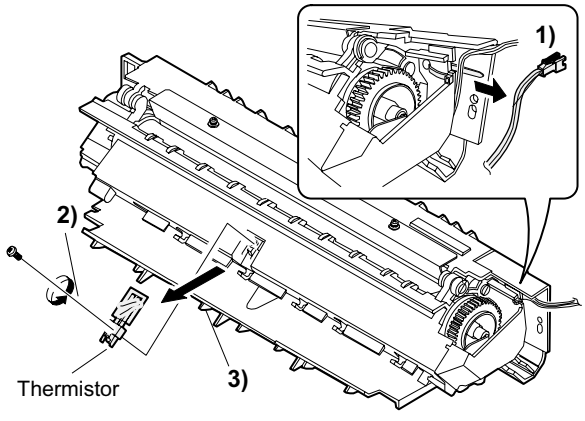
B. Disassembly procedure

1) Remove the connectors (3 pcs.) of the rear cabinet.

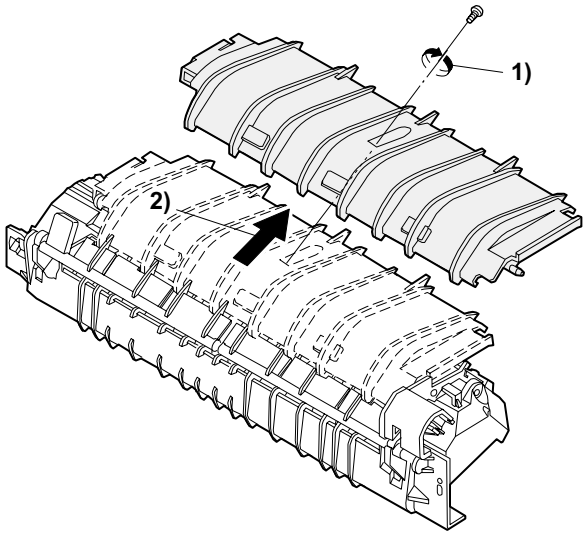
2) Open the side cover, remove two screws, and remove the fusing unit.



3) Cut the binding band, remove the screw, and remove the thermistor.

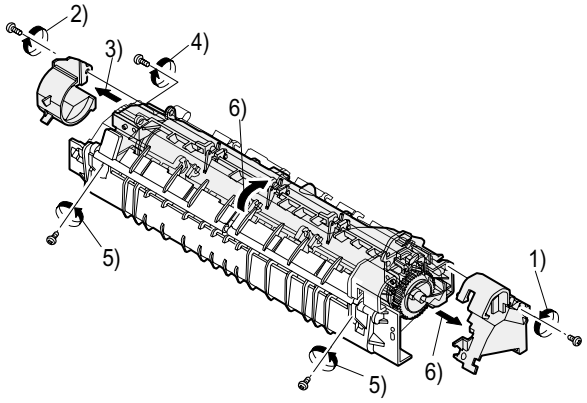


4) Remove the screw and remove the U-turn guide.

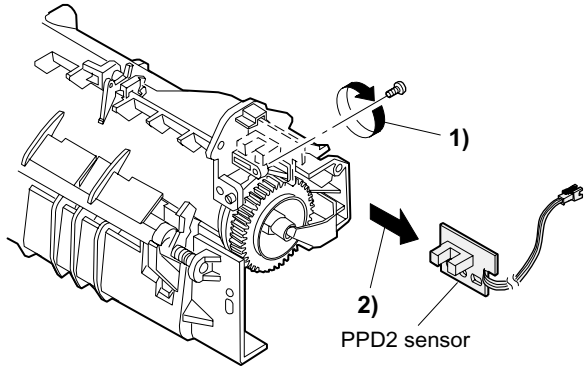


Pressure roller section disassembly

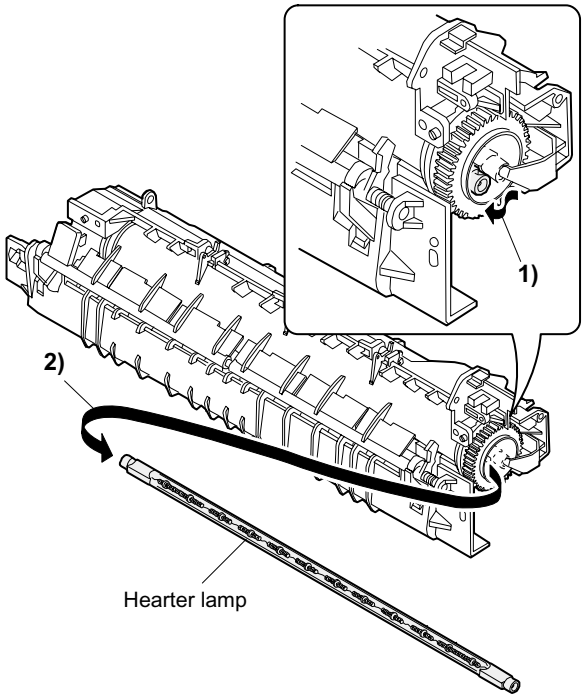
5) Remove the three screws, remove the fusing cover lower on the right side, and open the heat roller section.



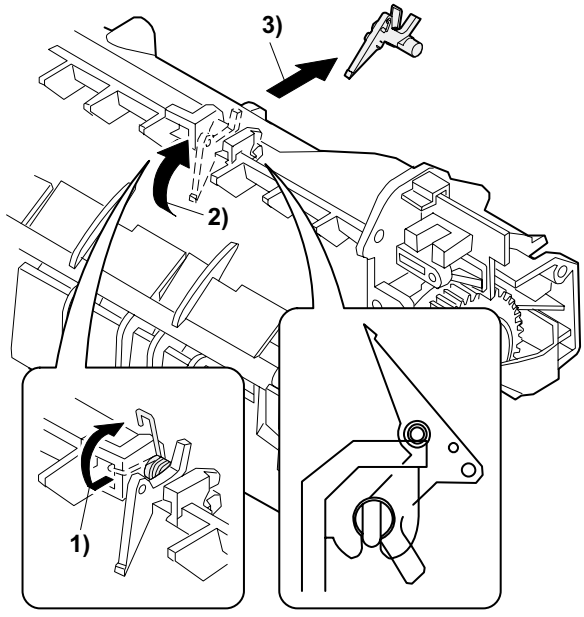
6) Remove the screw and remove the PPD2 sensor.



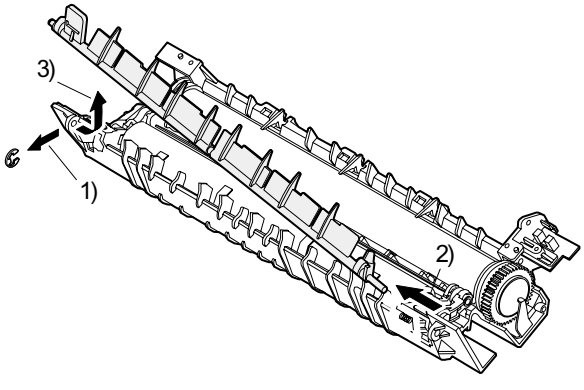
7) Remove the plate spring on the right and remove the heater lamp.



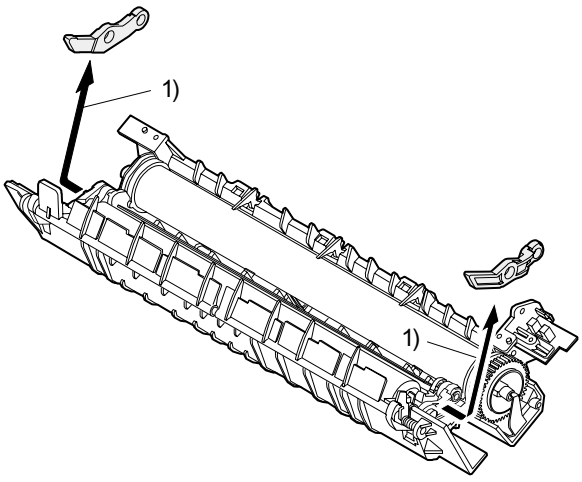
8) Remove the spring and remove the separation pawls (3 pcs.).



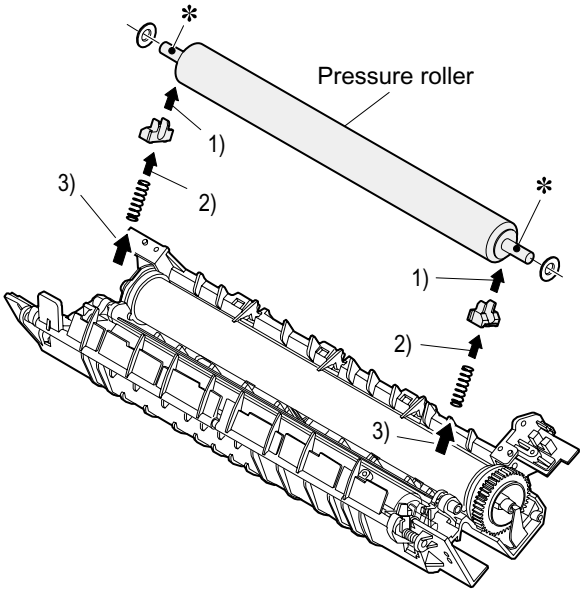
9) Remove the E-ring and remove the reverse gate.



10) Remove the pressure release levers on the right and the left sides.



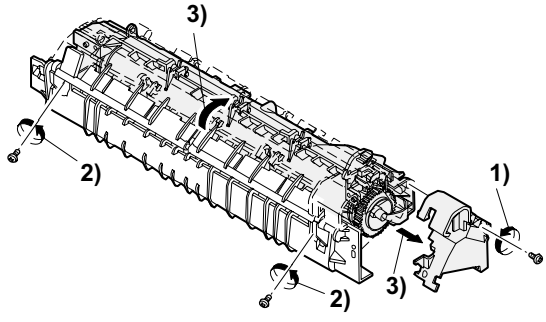
11) Remove the pressure roller, the pressure bearing, and the spring.
Note: Apply grease to the sections specified with*.



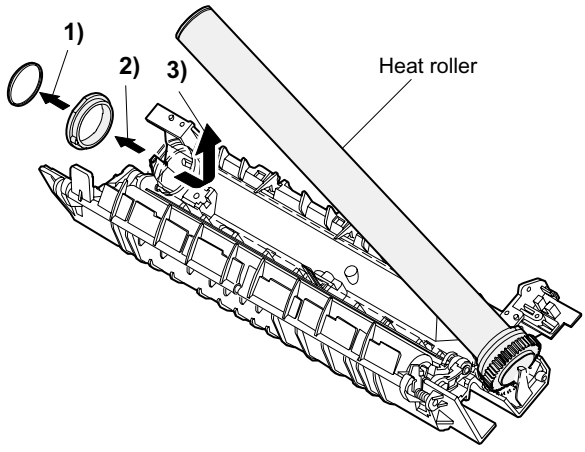
Heat roller disassembly

(Continued from procedure (4).)

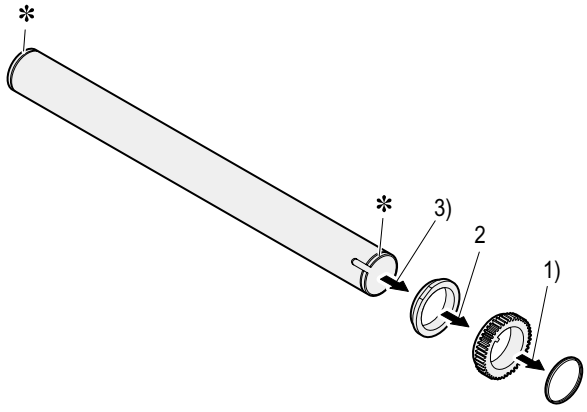
5) Remove screws, remove the fusing cover, and open the heat roller section.



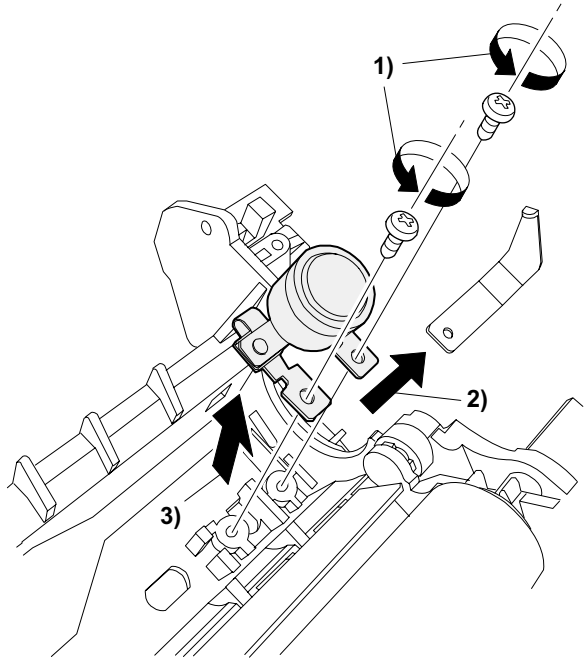
6) Remove the C-ring and the fusing bearing, and remove the heat roller.



7) Remove the parts from the heat roller.
Note: Apply grease to the sections specified with *.



8) Remove two screws and remove the thermo unit.



C. Assembly procedure

For assembly, reverse the disassembly procedure.

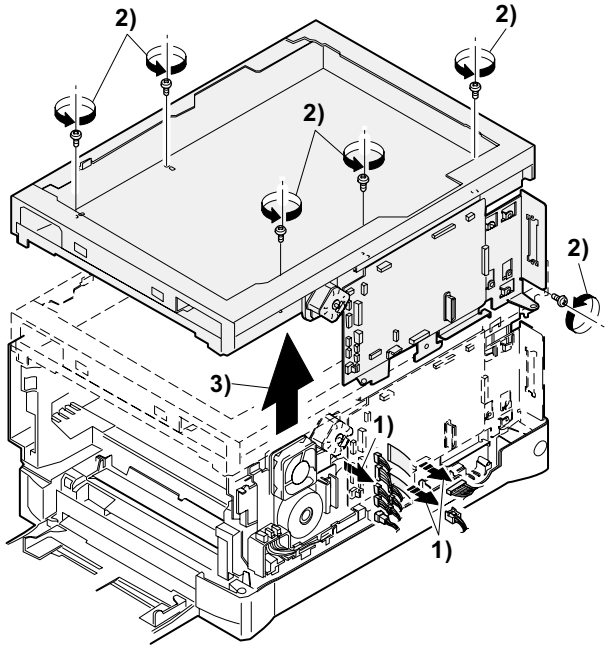
5. Tray paper feed/transport section

A. List

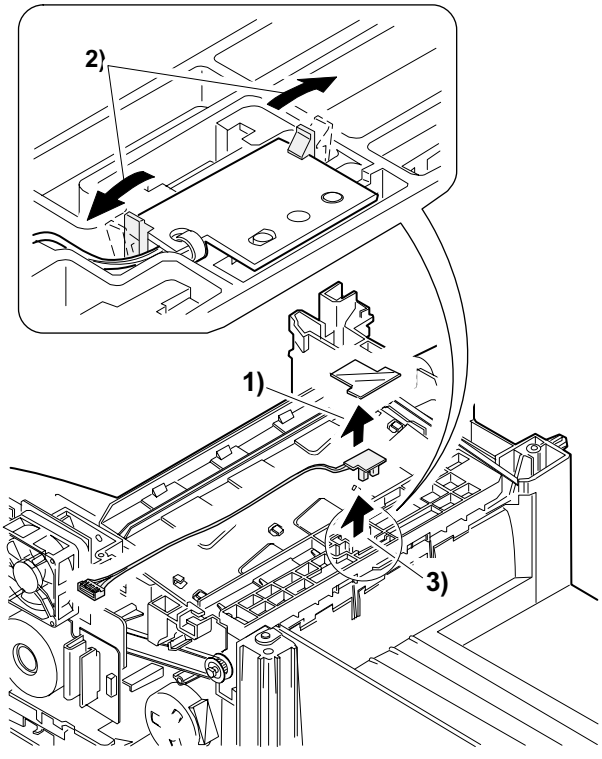
No.	Part name Ref.
1	PPD1 sensor PWB
2	LSU unit
3	Intermediate frame unit
4	Paper feed roller

B. Disassembly procedure

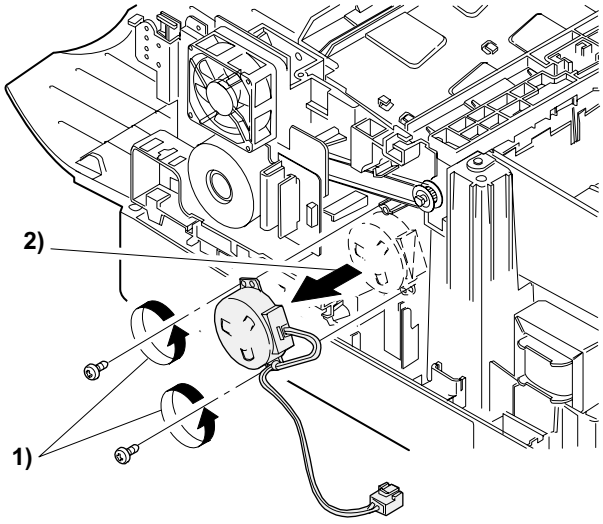
1) Remove six connectors and screws of the main PWB, and lift the optical unit and the main PWB to remove.



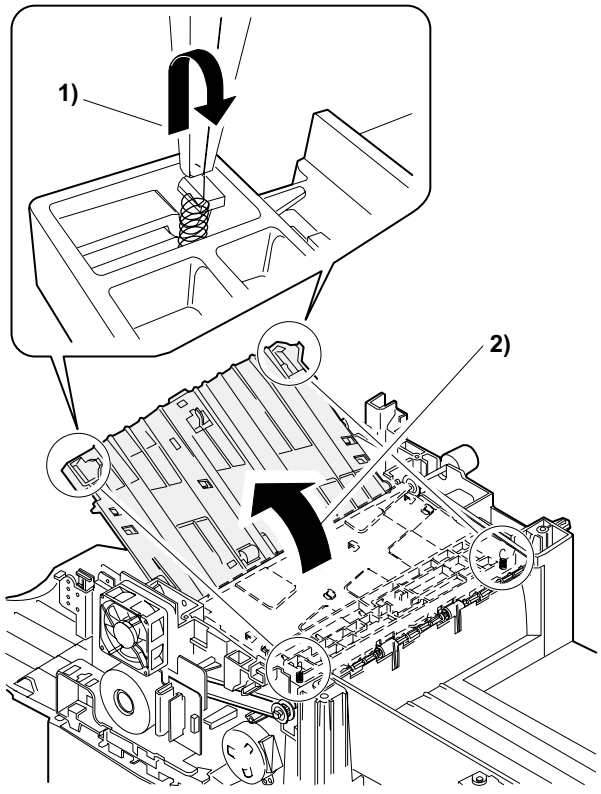
2) Remove the PWB insulation mylar and remove the paper transport detection sensor (PPD2).



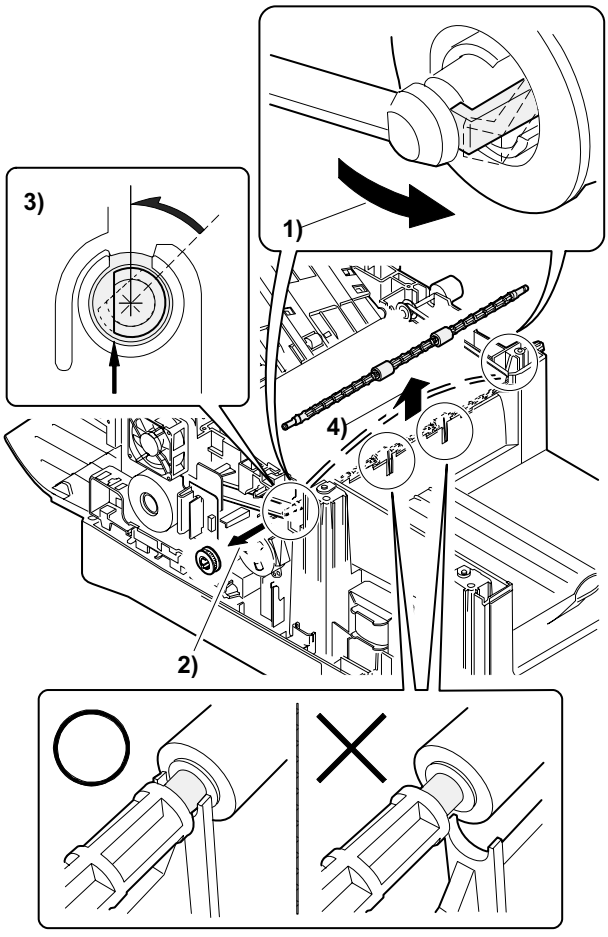
3) Remove two screws and remove the toner motor.



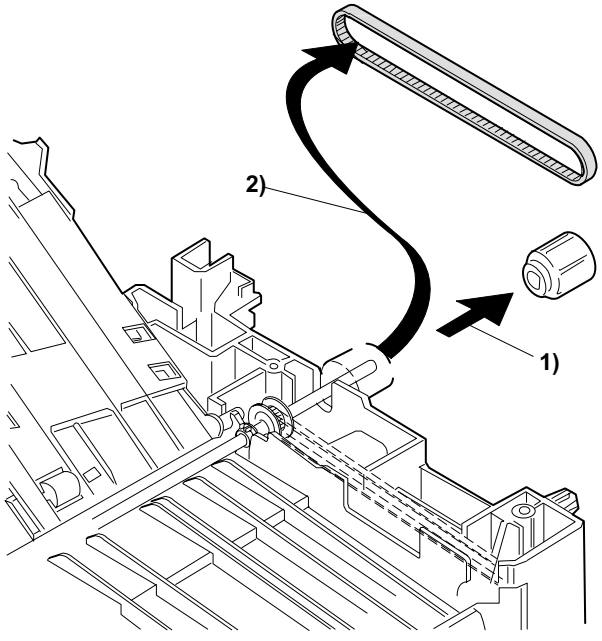
4) Remove two springs and open the intermediate frame unit.



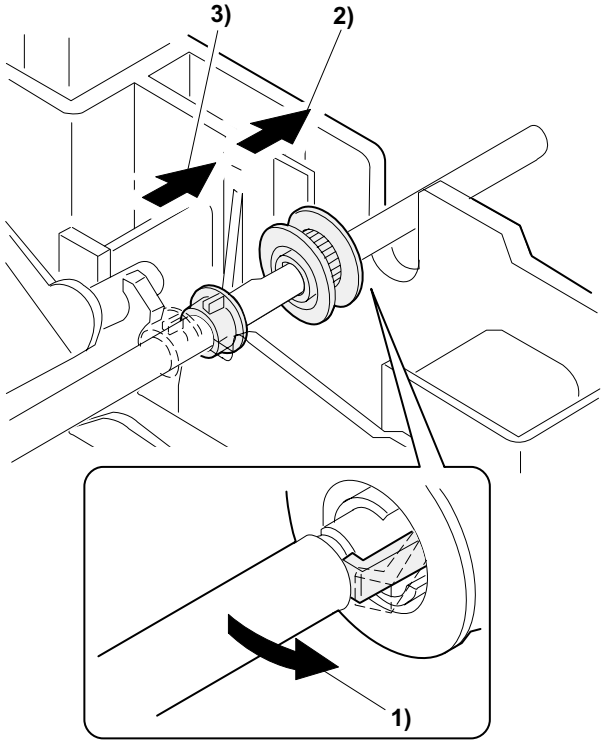
5) Remove the pulleys on the both sides and remove the paper exit roller.



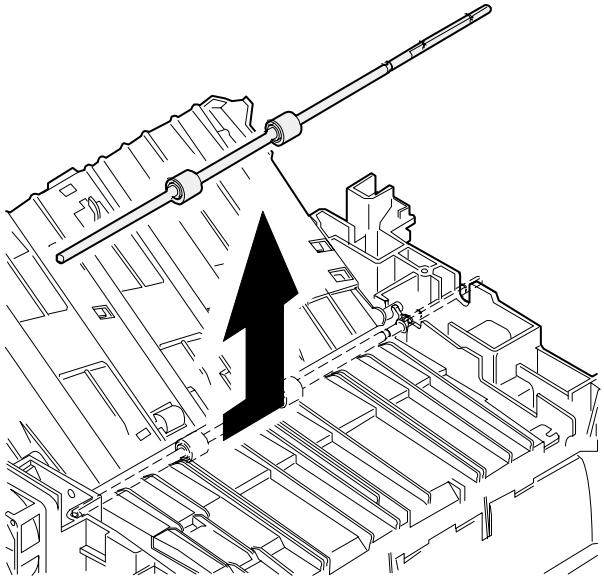
6) Pull out the paper exit roller knob and remove the belt.



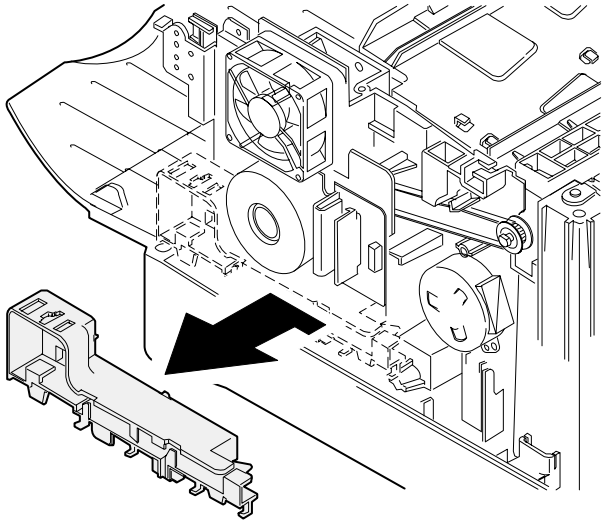
7) Release the belt pulley (a) lock and remove the belt pulley bearing.



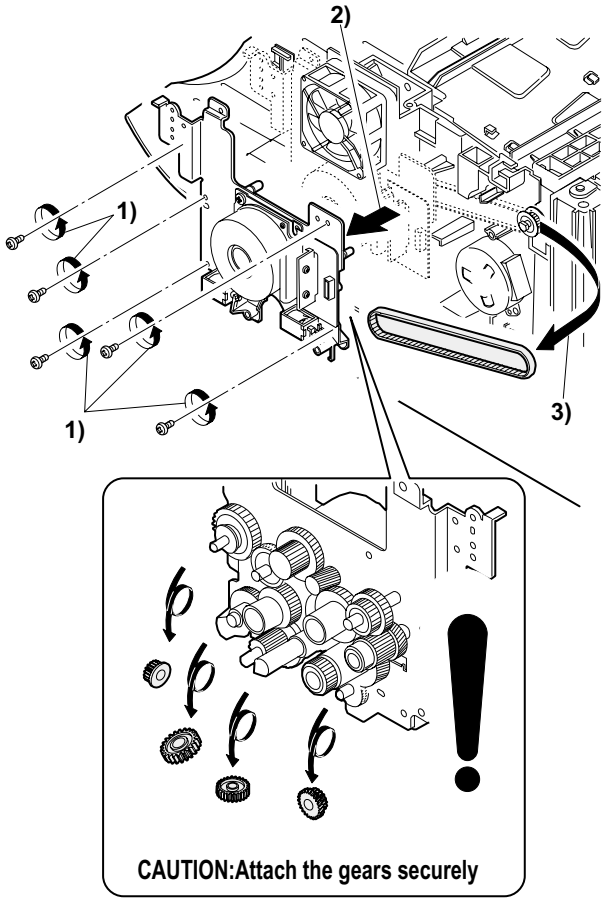
8) Remove the paper exit roller.



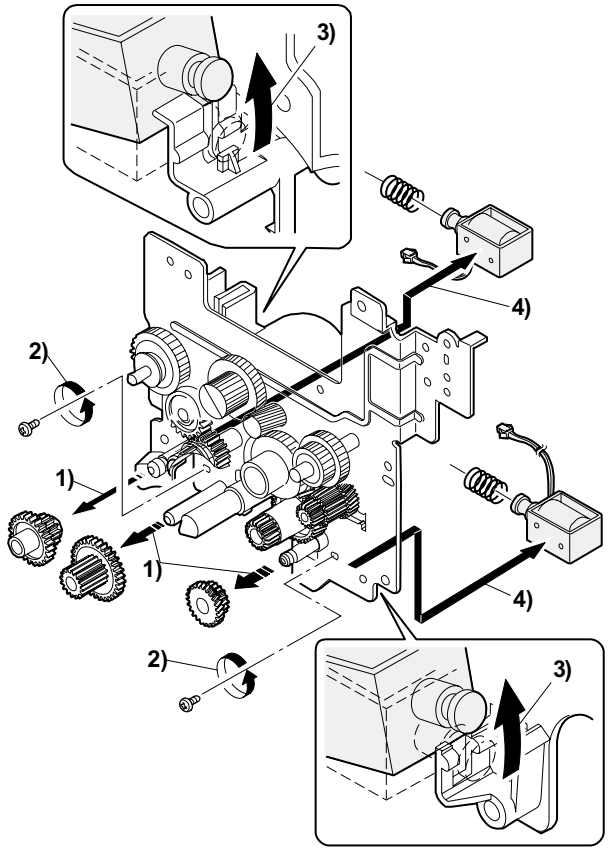
9) Remove the harness guide.



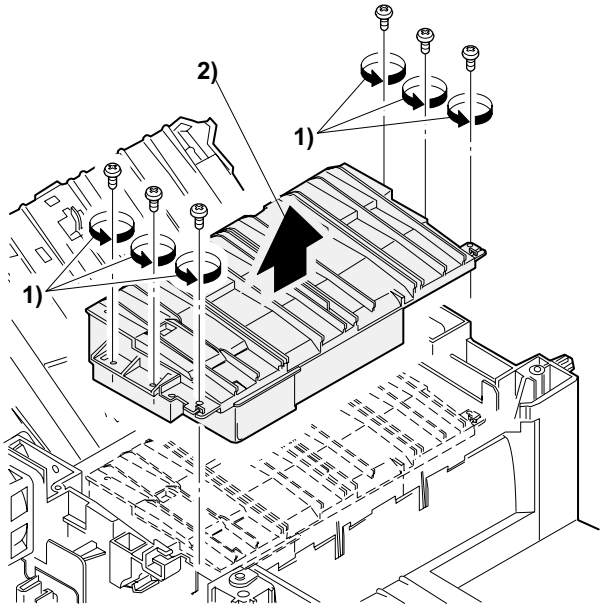
10) Remove five screws and remove the main drive plate and the belt.



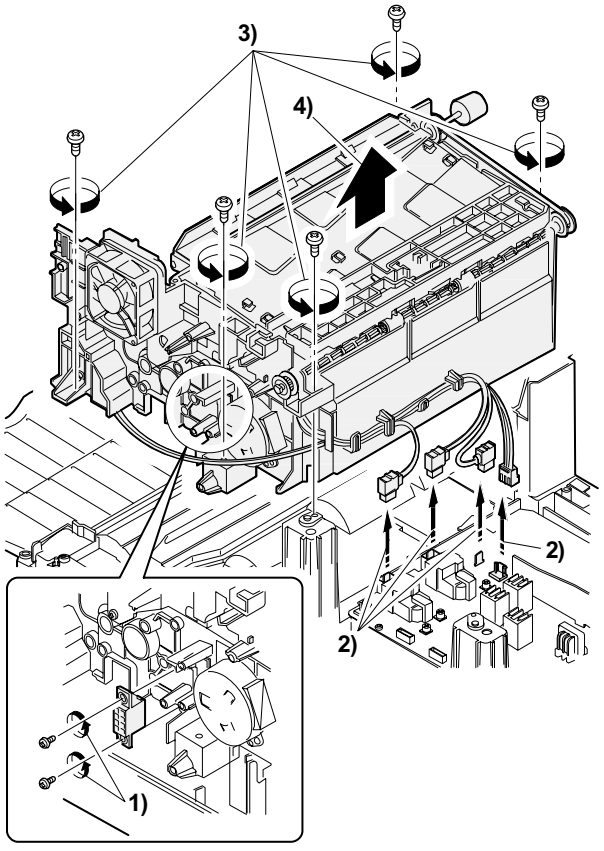
11) Remove the parts as shown below, and remove the pressure release solenoid and the paper feed solenoid.



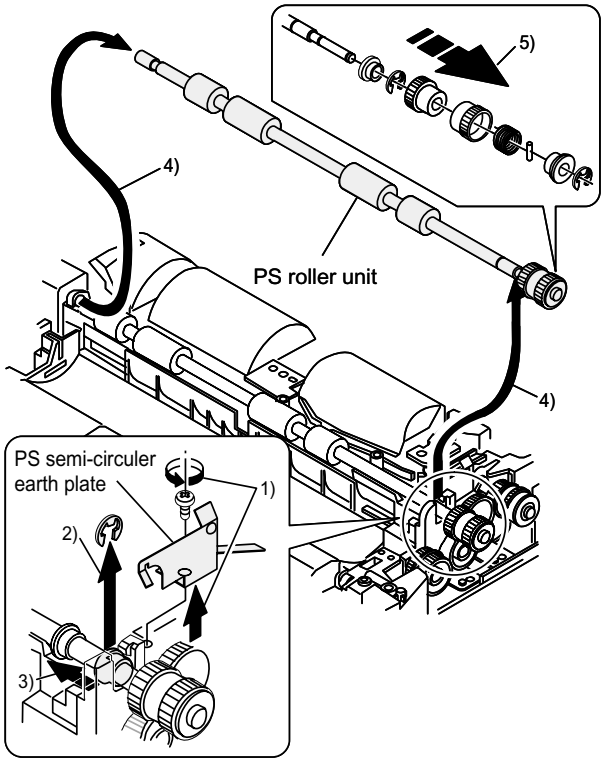
12) Remove six screws and remove the LSU unit.



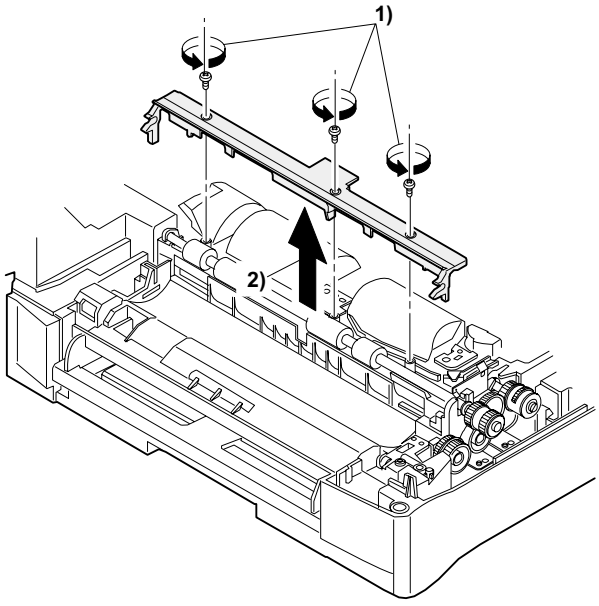
13) Remove two screws and remove the fusing connector.
14) Remove five screws and the connector, and lift the intermediate frame unit to remove.



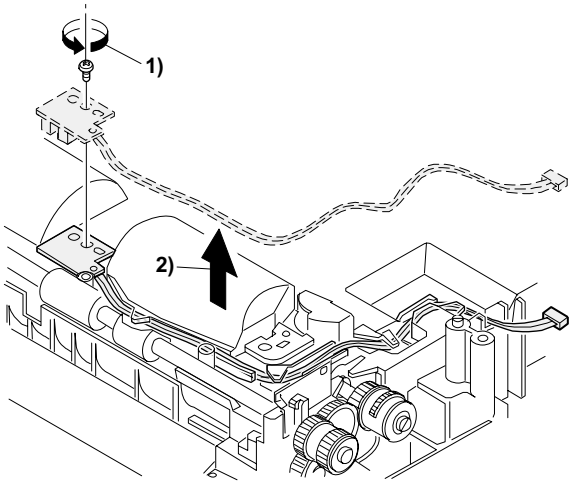
15) Remove the screw and the E-ring, and remove the PS semi-circular earth plate and the PS roller unit.
16) Remove the E-ring and remove the spring clutch from the PS roller unit.



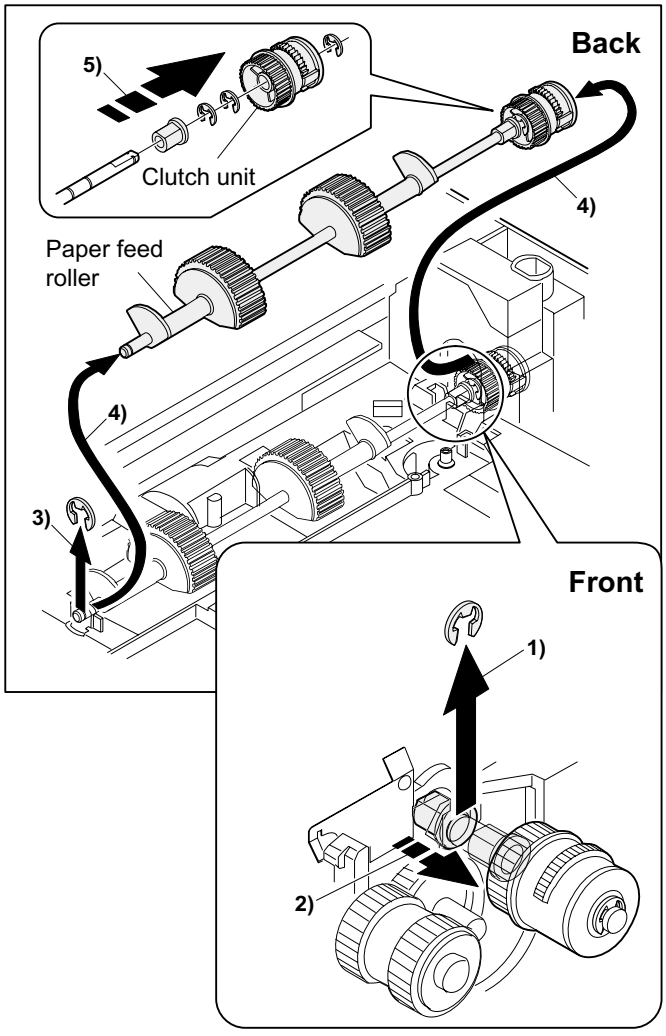
17) Remove three screws and remove the TC front paper guide.



18) Remove the screw and the connector, and remove the PPD1 sensor PWB.



19) Remove two E-rings and remove the paper feed roller.
20) Remove three E-rings and remove the clutch unit.



C. Assembly procedure

For assembly, reverse the disassembly procedure.

6. Manual paper feed section

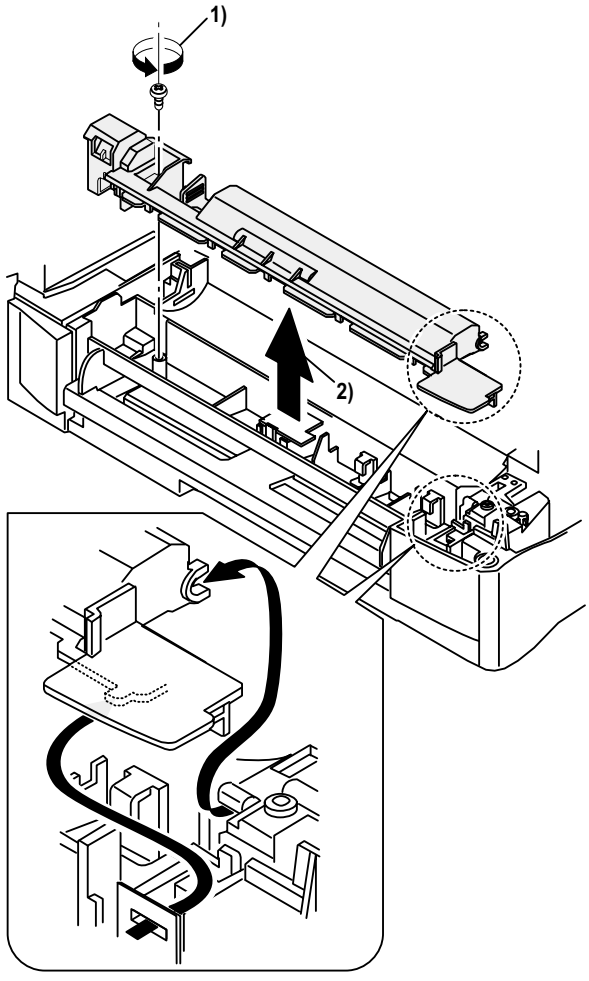
A. List

No.	Part name Ref.
1	Manual transport roller
2	Cassette detection switch
3	PPD1 sensor PWB
4	Side door detection unit

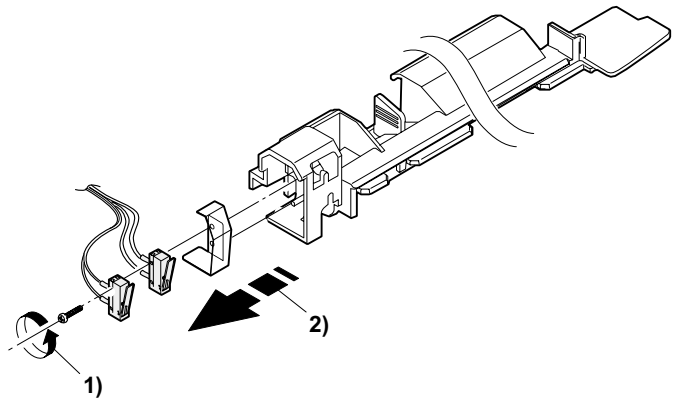
B. Disassembly procedure

Single unit

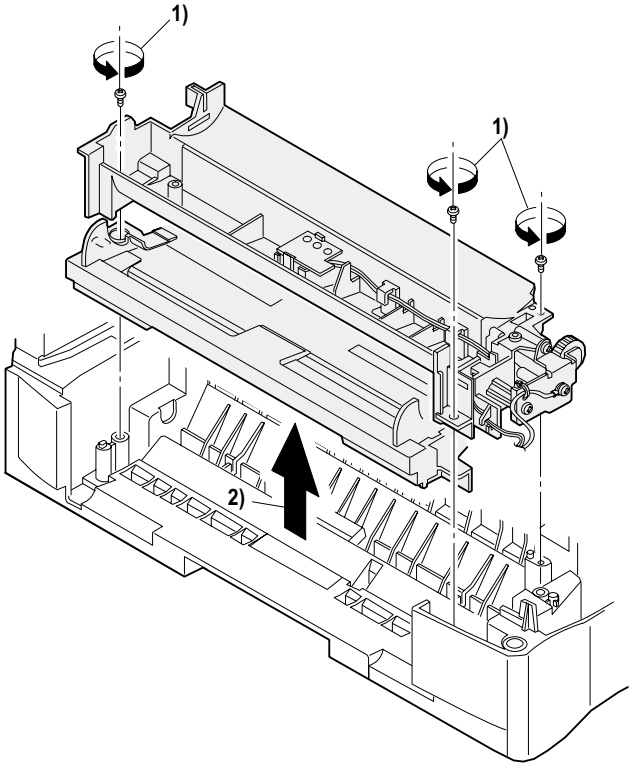
1) Remove the screw and remove the single upper cover.



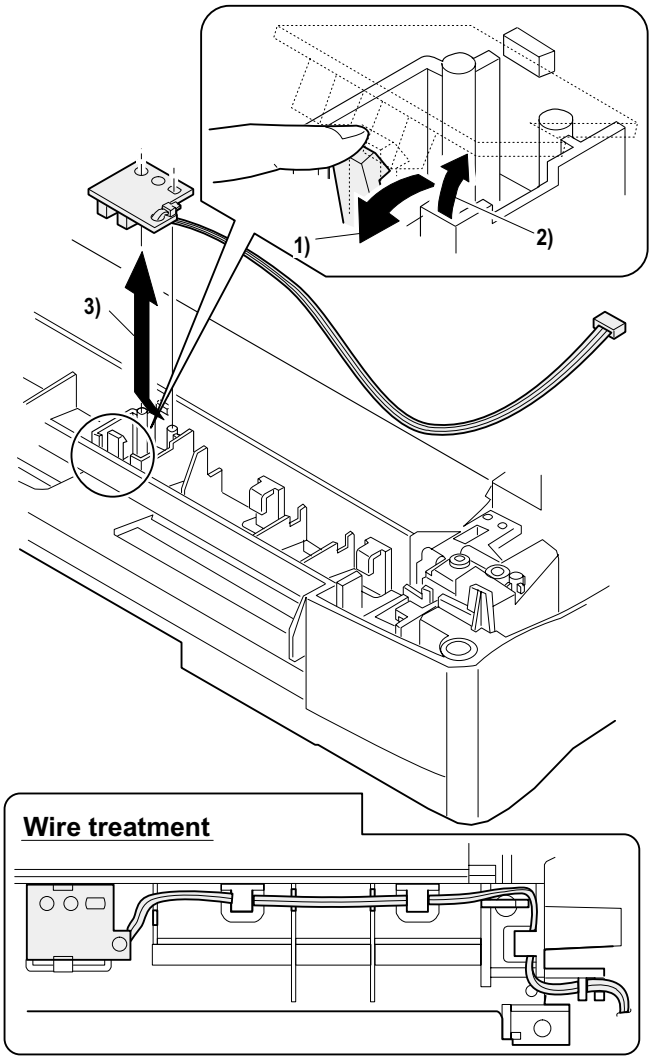
2) Remove the screw and remove the side door detection unit.



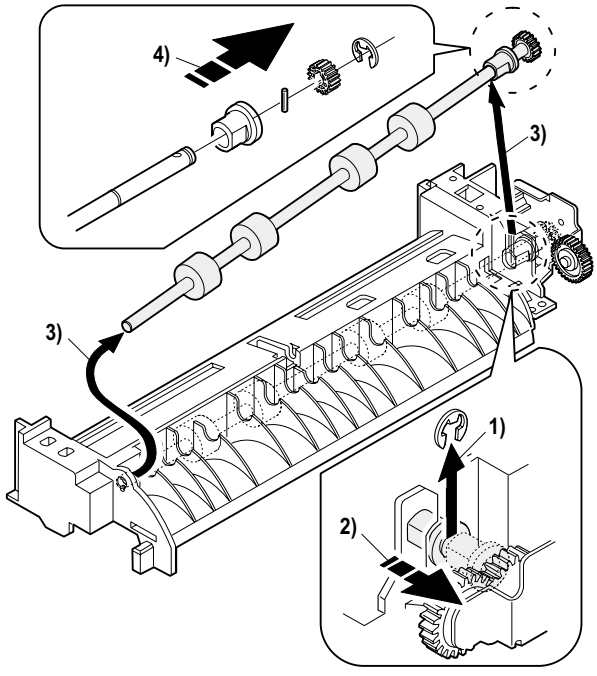
3) Remove three screws and remove the single manual feed upper frame.



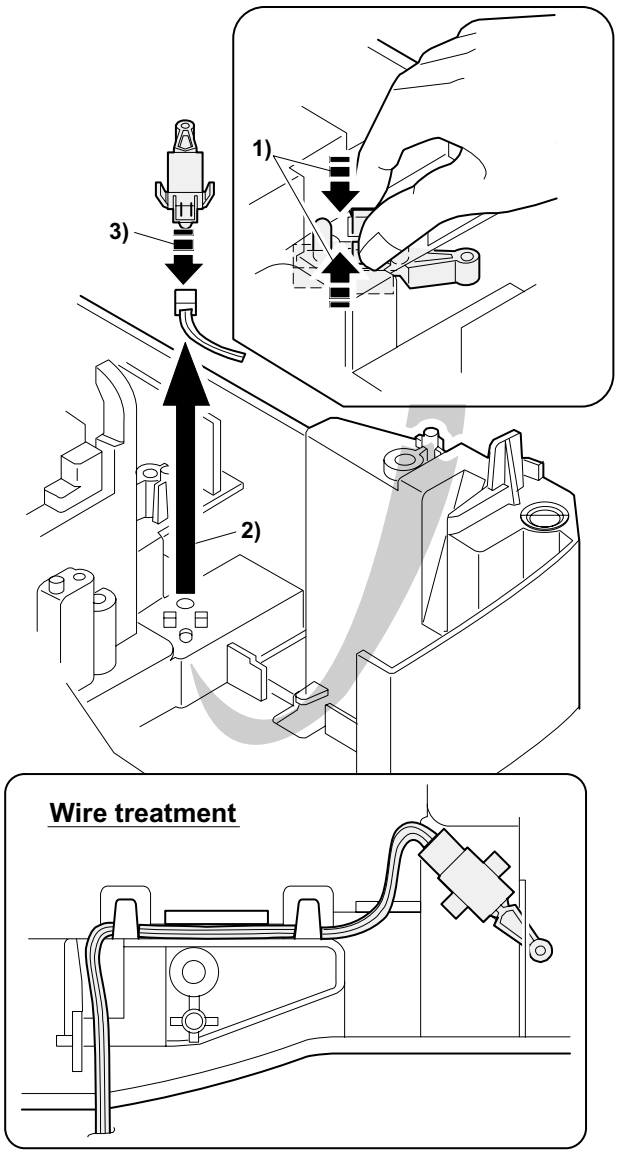
4) Remove the PPD1 sensor PWB.



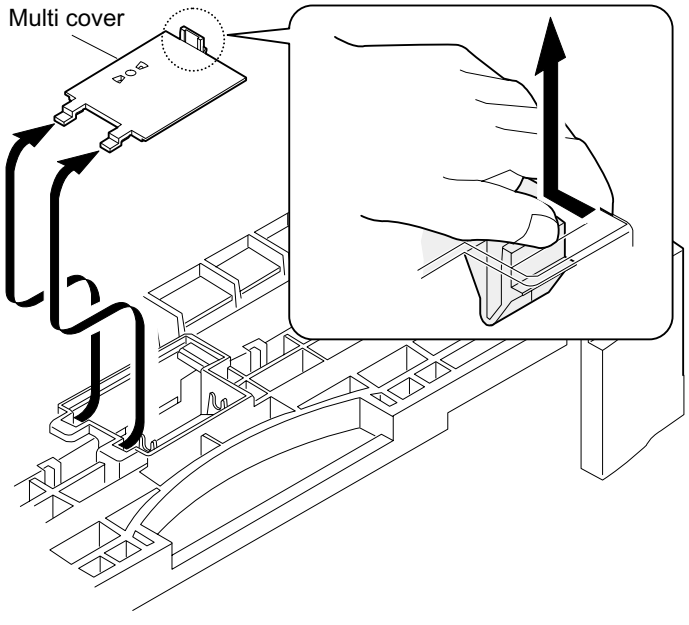
5) Remove the E-ring and remove the manual paper feed transport roller.



6) Remove the cassette detection switch.

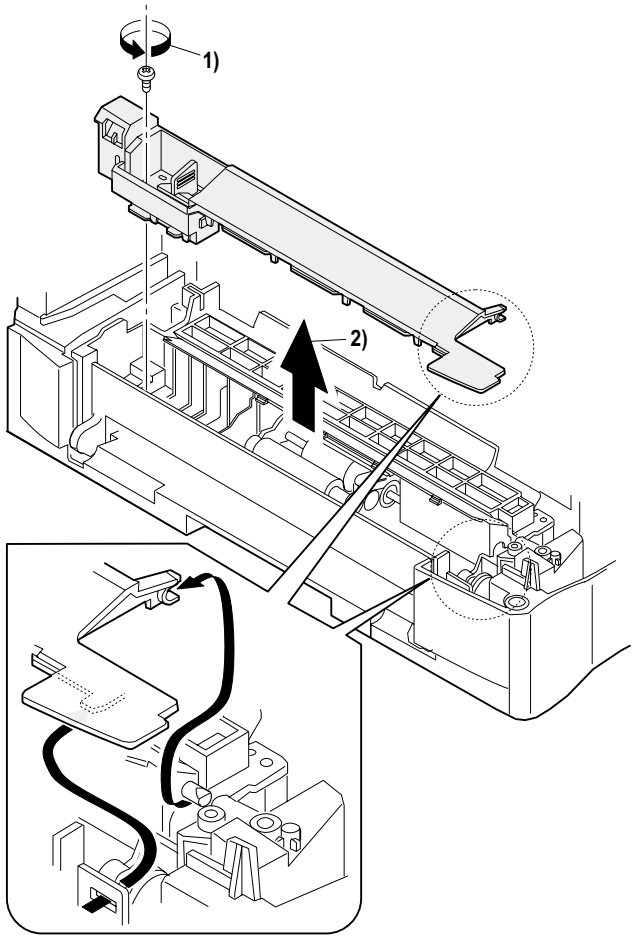


7) Remove the multi cover.

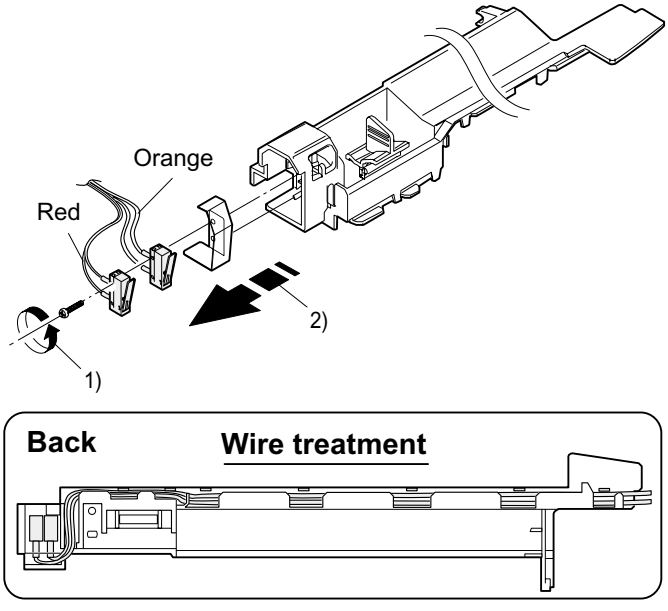


Multi unit

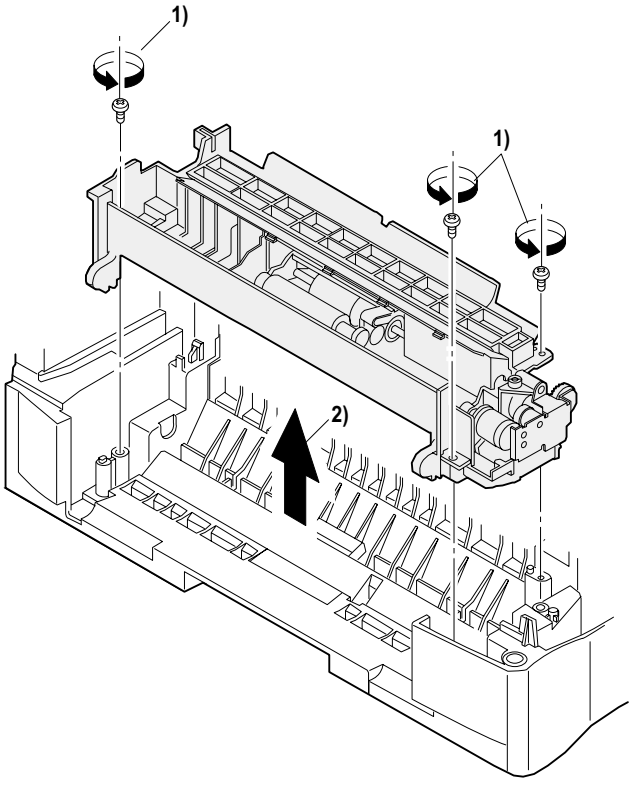
1) Remove the screw and remove the multi upper cover.



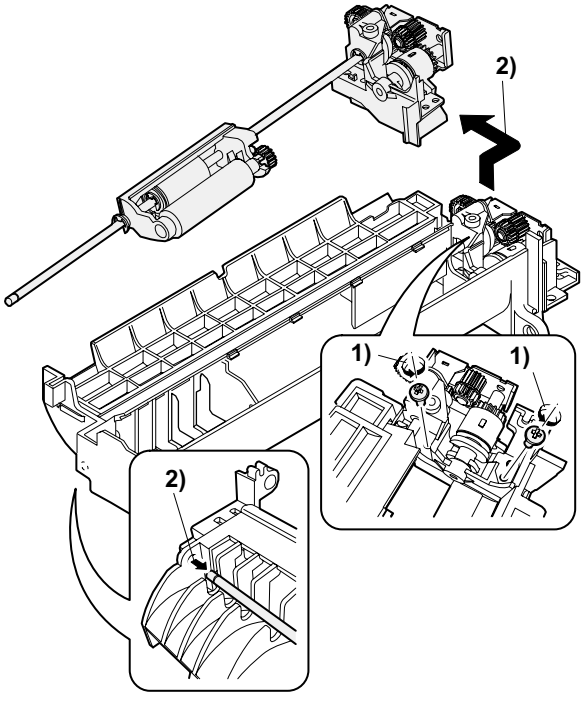
2) Remove the screw and remove the side door detection unit.



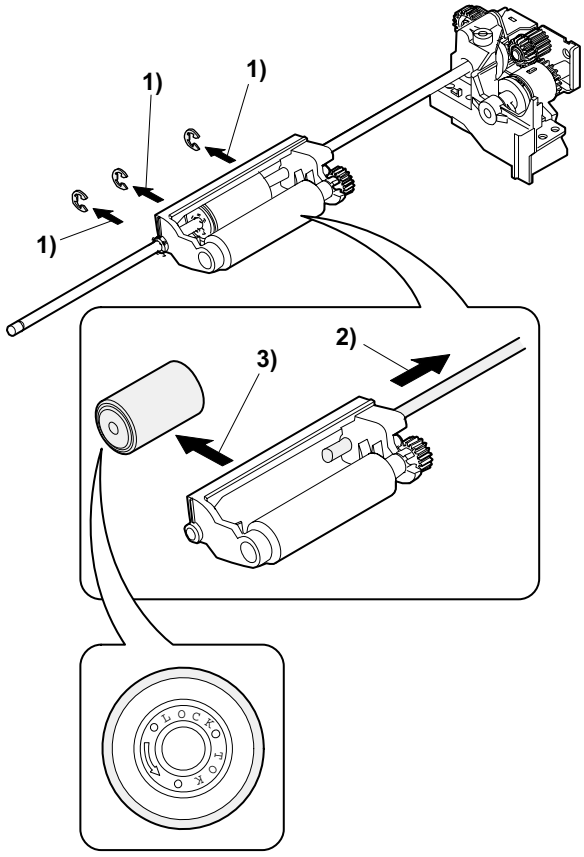
3) Remove three screws and remove the multi paper feed upper frame.



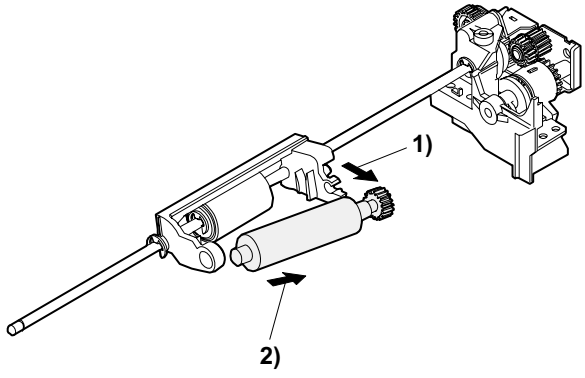
4) Remove two screws and remove the multi feed bracket unit from the multi paper feed upper frame.



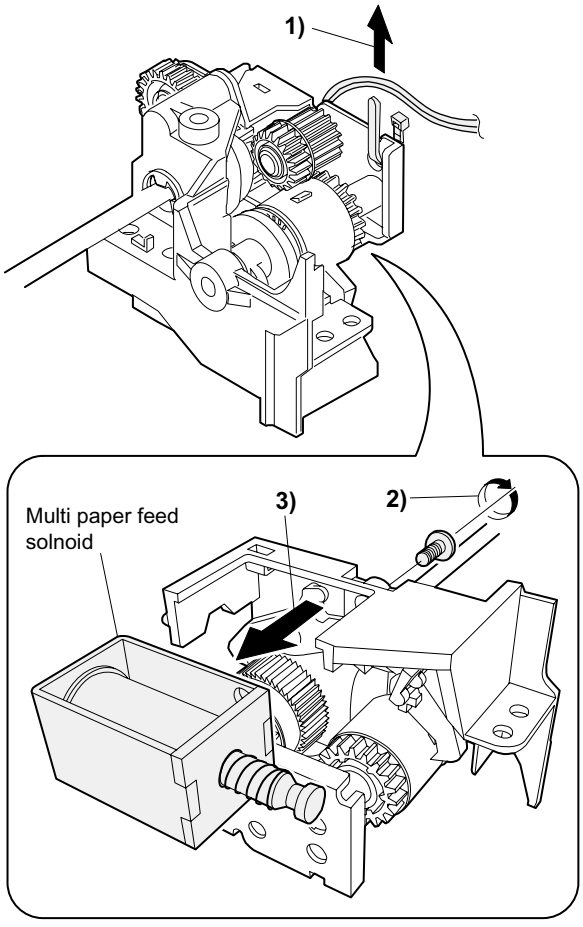
5) Remove three E-rings and remove the manual paper feed roller B9.



6) Remove the pick-up roller.



7) Cut the binding band and remove the multi paper feed solenoid.

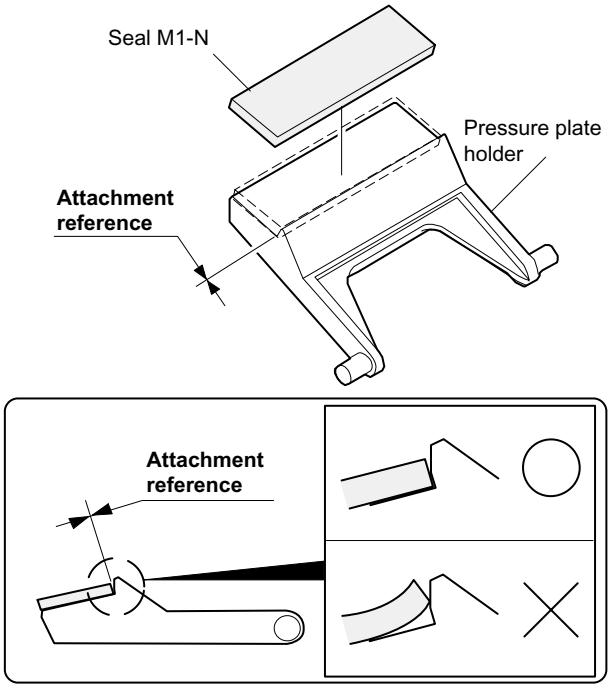


C. Assembly procedure

For assembly, reverse the disassembly procedure.

D. Pressure plate holder attachment

1) Attach the pressure plate holder so that the resin section is not covered with the seal M1-N.



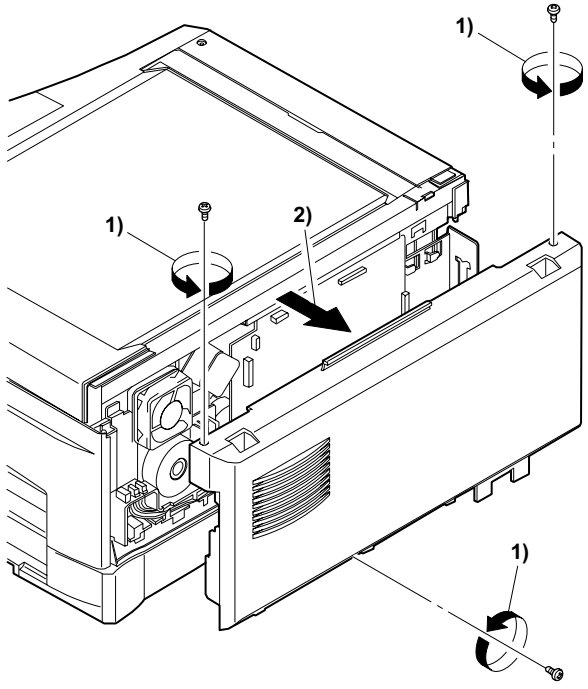
7. Rear frame section

A. List

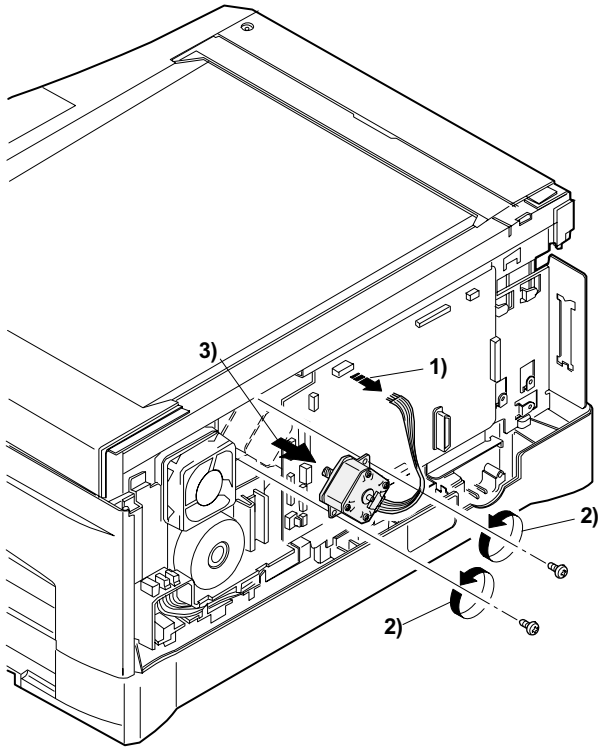
No.	Part name Ref.
1	Mirror motor
2	Main motor
3	Exhaust fan motor

B. Disassembly procedure

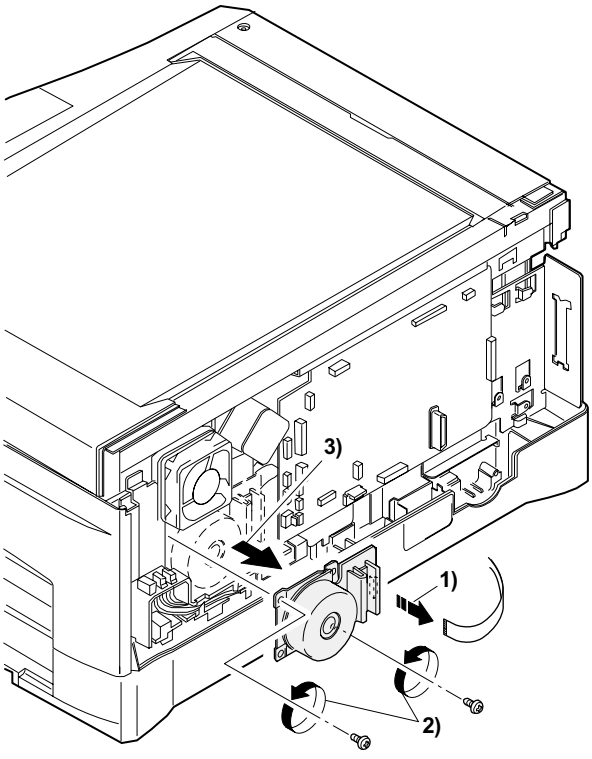
1) Remove three screws and remove the rear cabinet.



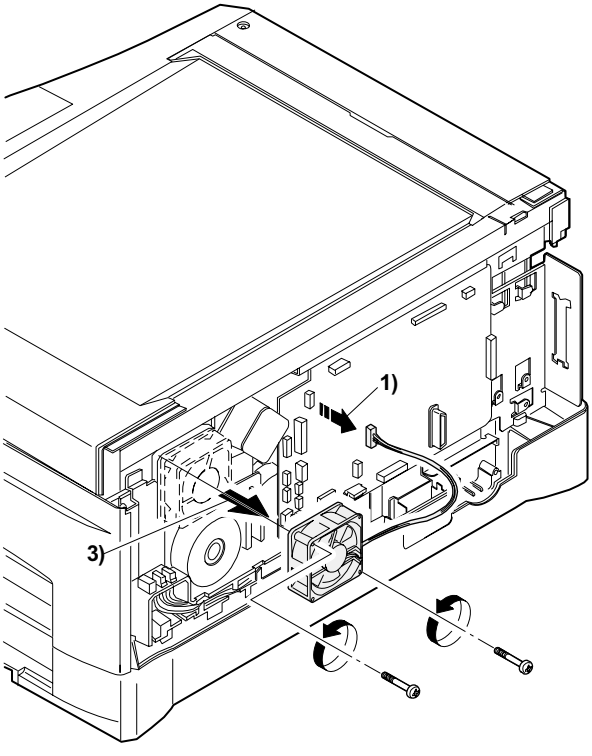
2) Remove two screws, the harness, and the mirror motor.



3) Remove two screws and one harness, and remove the main motor.



4) Remove two screws and one connector, and remove the exhaust fan motor.



C. Assembly procedure

For assembly, reverse the disassembly procedure.

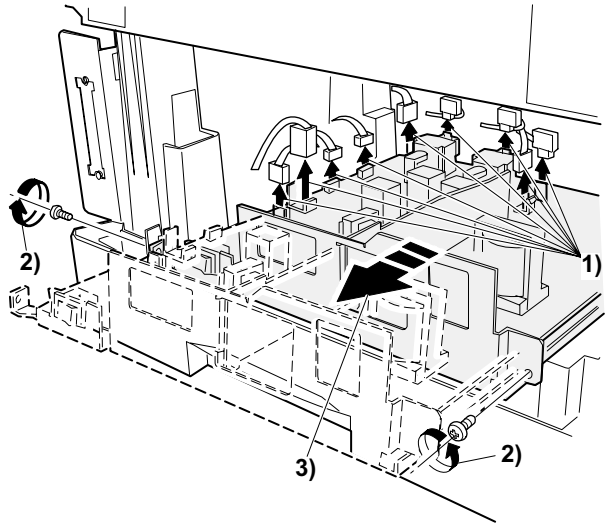
8. Power section

A. List

No.	Part name Ref.
1	Power PWB

B. Disassembly procedure

1) Remove two screws and one connector, and remove the power PWB.



C. Assembly procedure

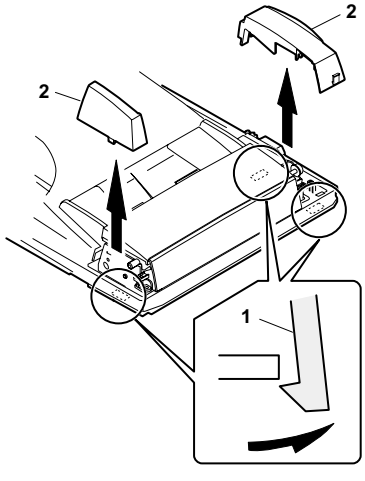
For assembly, reverse the disassembly procedure.

9. SPF section (SPF model only)

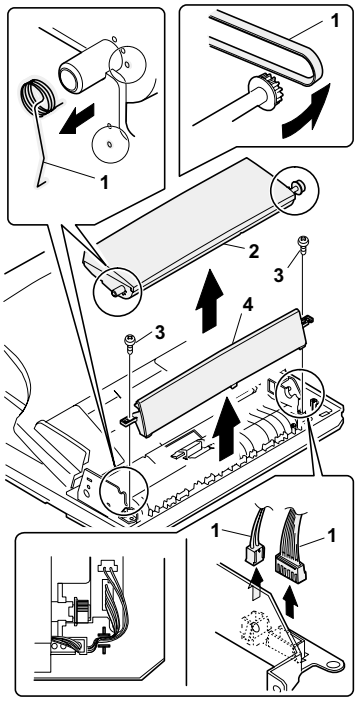
No.	Part name Ref.
A	Sensor PWB
B	Pickup solenoid
C	Clutch
D	Manual paper feed roller, pickup roller
E	Belt
F	SPF motor
G	Paper entry sensor
H	PS roller
I	Paper exit roller

Pickup unit removal

1) Remove three fixing pawls from the bottom of the machine.
2) Remove the front cover and the rear cover.



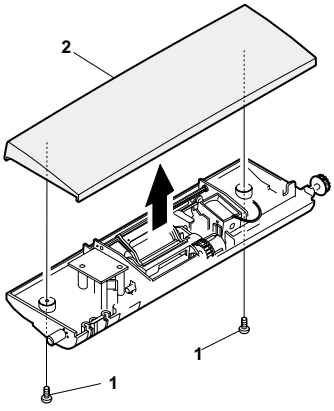
1) Remove the belt, the paper feed frame Spring, and two harnesses.
2) Remove the pickup unit.



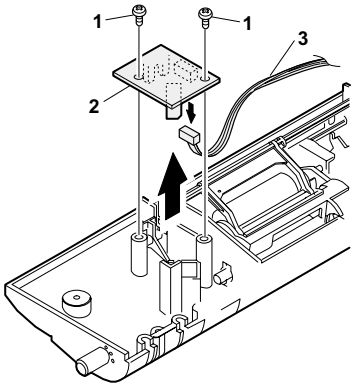
* When installing the parts, be careful of the hole position of the paper frame Spring.

A. Sensor PWB

1) Remove two screws from the bottom of the pickup unit.
2) Remove the upper cover.

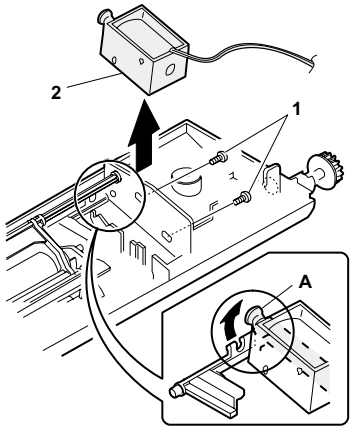


1) Remove two screws.
2) Remove the sensor PWB.
3) Remove the harness.



B. Pickup solenoid

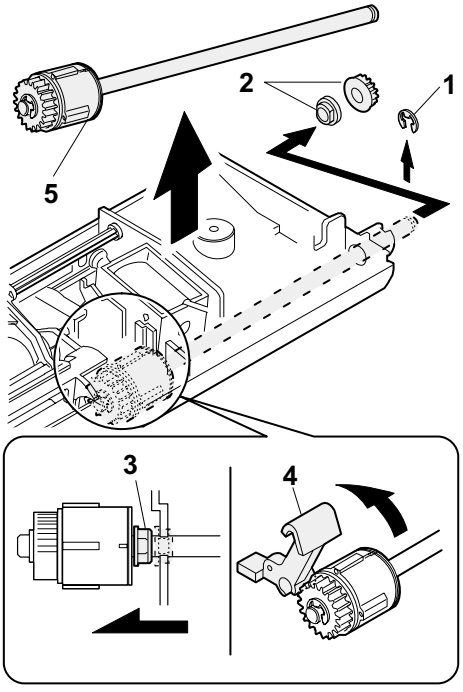
1) Remove two screws.
2) Remove the pickup solenoid



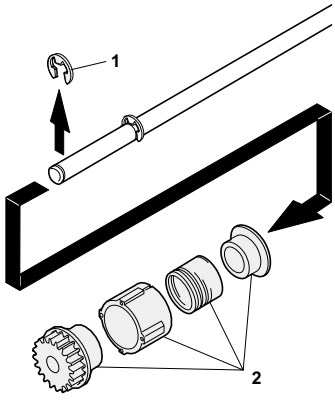
* When installing, hang iron core A on the solenoid arm.

C. Clutch

1) Remove the E-ring.
2) Remove the pulley and bush.
3) Slide the bush in the arrow direction.
4) Lift the clutch, and 5) remove the clutch.

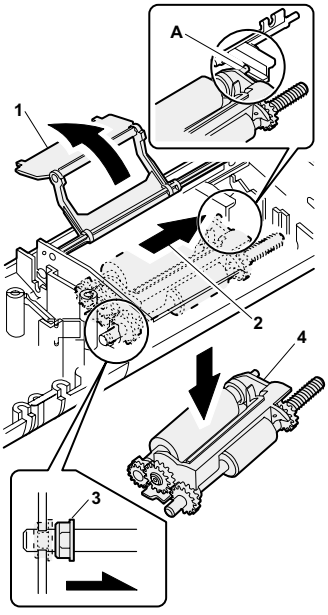


1) Remove the E-ring.
2) Remove the parts.



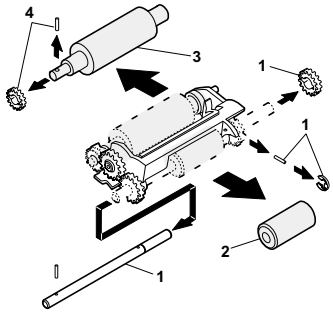
D. Manual paper feed roller, pickup roller

1) Lift the paper stopper.
2) Slide the takeup roller unit.
3) Slide the bushing in the direction of the arrow.
4) Remove the takeup roller unit.



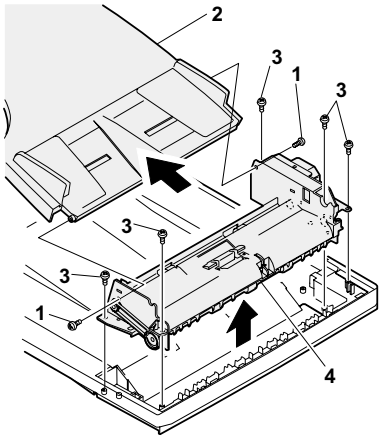
* When installing the takeup roller, hang the projection of the takeup roller unit on the solenoid arm.

1) Remove the parts.
2) Remove the manual paper feed roller.
3) Remove the pickup roller.
4) Remove the parts.



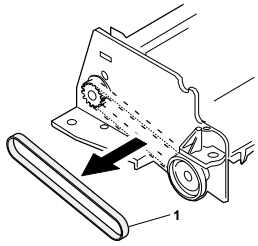
Transport unit removal

1) Remove two screws.
2) Remove the document tray unit.
3) Remove five screws.
4) Remove the transport unit.



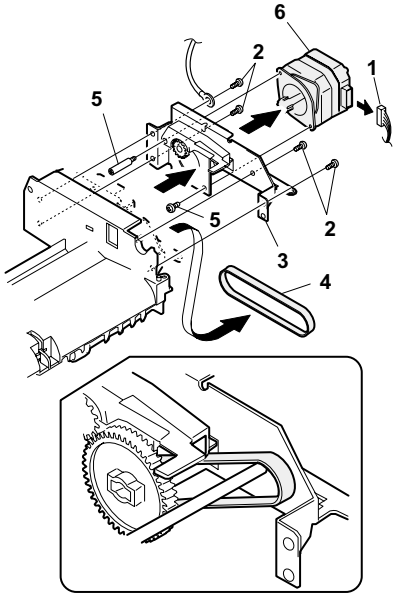
E. Belt

1) Remove the belt.



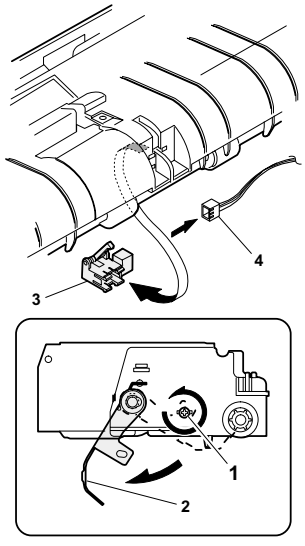
F. SPF motor

1) Remove the harness.
2) Remove four screws.
3) Remove the drive unit.
4) Remove the belt.
5) Remove two screws.
6) Remove the SPF motor.



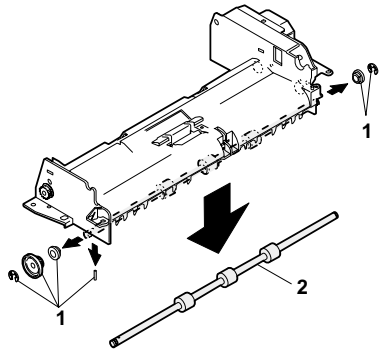
G. Paper entry sensor

1) Loosen the screw.
2) Open the paper exit paper guide.
3) Remove the paper entry sensor.
4) Remove the harness.



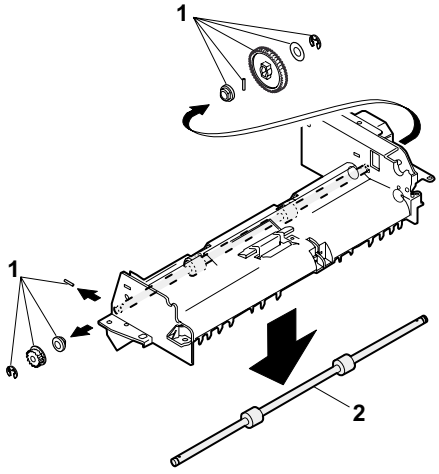
H. PS roller

1) Remove the parts.
2) Remove the paper supply roller.



I. Paper exit roller

1) Remove the parts.
2) Remove the paper exit roller.



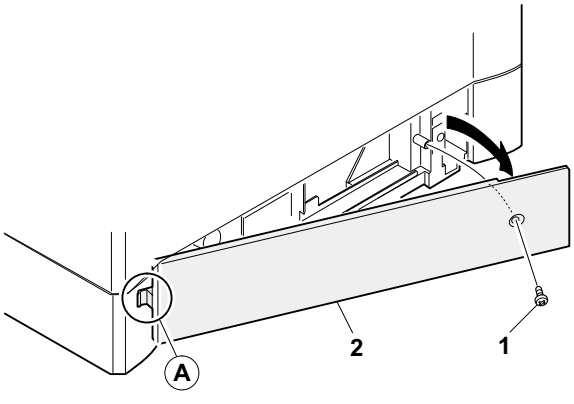
10.2nd cassette section

No.	Part name Ref.
A	Paper sensor
B	Cassette detection SW
C	Paper feed solenoid
D	Transport roller
E	Paper feed clutch
F	2nd paper feed roller

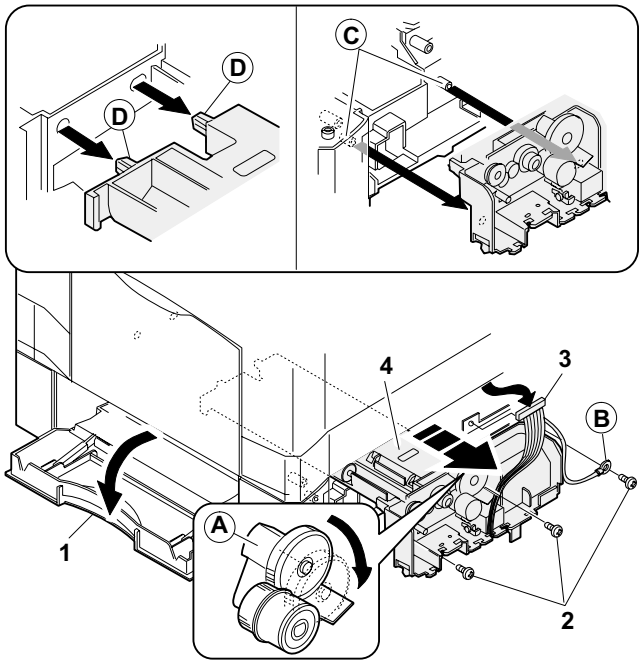
Paper feed unit removal

1) Remove the screw.
2) Remove the rear cover.

* When installing, engage the pawl and install the unit.



1) Open the right cabinet.
2) Remove three screws.
3) Remove one connector.
4) While tilting down the 2nd connection arm A, pull and remove the paper feed unit toward you.

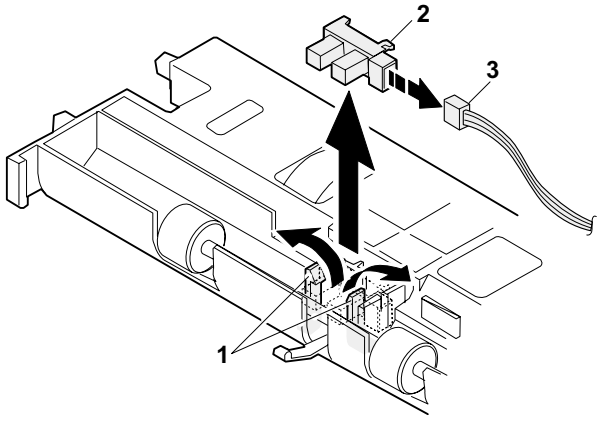


* When installing, securely insert two bosses C on the machine side and two bosses D on the paper feed unit side. Be sure to secure the ground wire B.

* Insert the 2nd page feed.

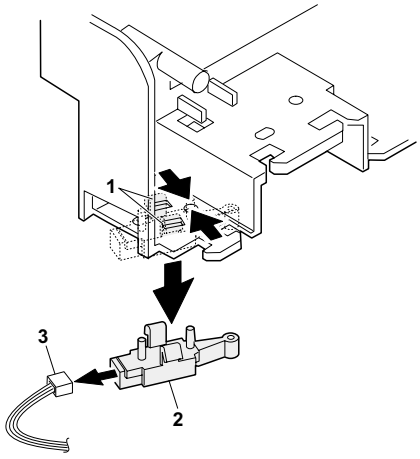
A. Paper sensor

1) Remove the pawl.
2) Remove the paper sensor.
3) Remove the harness.



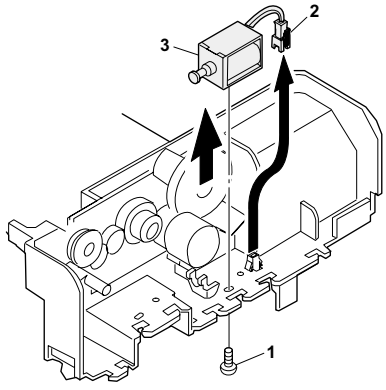
B. Cassette detection switch

1) Remove the pawl.
2) Remove the cassette detection switch.
3) Remove the harness.



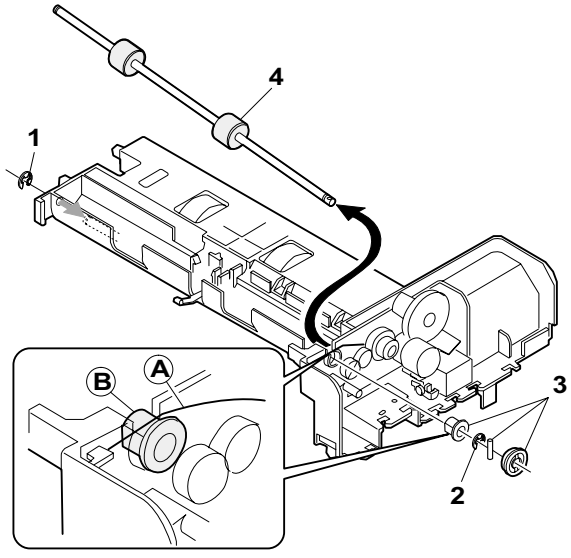
C. Paper feed solenoid

1) Remove the screw.
2) Remove the connector.
3) Remove the paper feed solenoid.



D. Transport roller

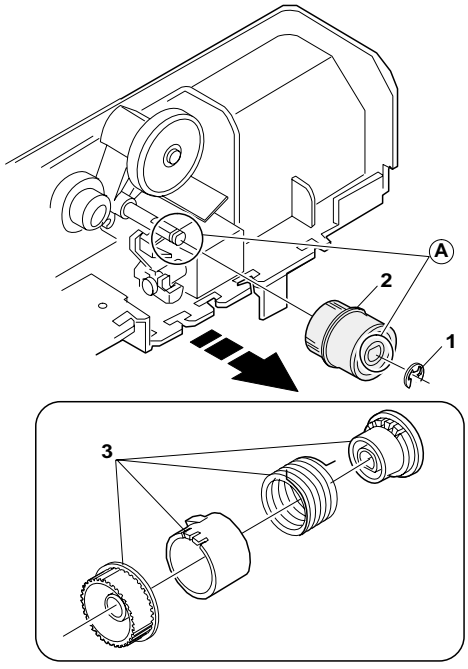
1) Remove two E-rings.
2) Remove the transport roller.



* Install so that the earth spring A is brought into contact over bearing B.

E. Paper feed clutch

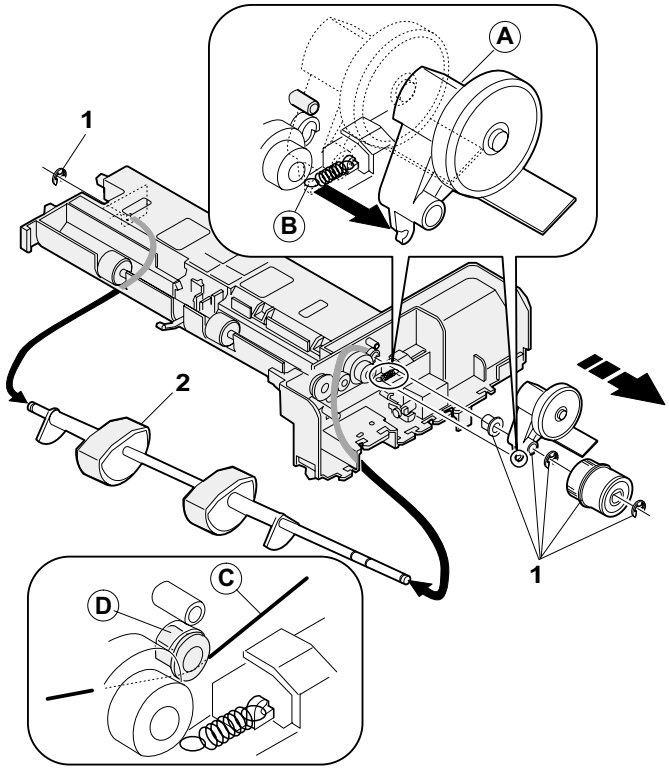
1) Remove the E-ring.
2) Remove the paper feed clutch.
3) Remove the parts.



* When installing, fit the cut surface A.

F. 2nd paper feed roller

1) Remove the E-ring and the parts.
2) Remove the 2nd paper feed roller.



* When installing, hang the 2nd connection arm on the 2nd connection arm Spring B. Be sure to install so that the earth spring C is in contact under the bearing D.

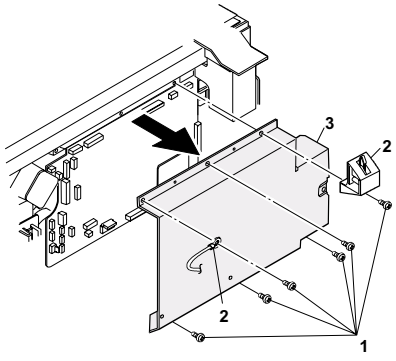
11.Duplex motor section (RSPF model only)

A. Remove the rear cabinet.

1) Remove four screws.
2) Remove the rear cabinet.

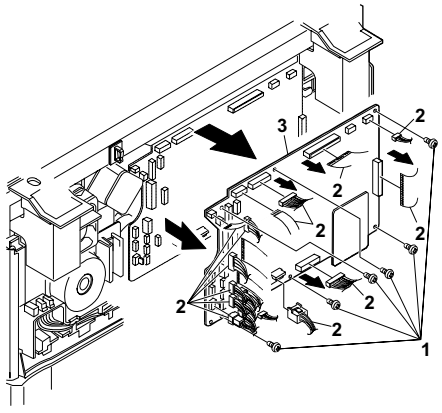
B. Remove the shield plate.

1) Remove six screws.
2) Remove the open/close detection unit, and the earth wire.
3) Remove the shield plate.



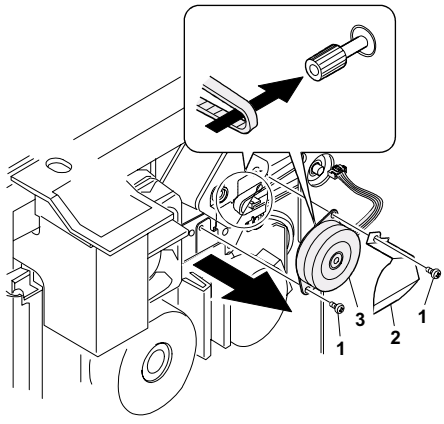
C. Remove the main PWB.

1) Remove six screws.
2) Remove connectors.
3) Remove the main PWB.



D. Remove the Duplex motor.

1) Remove two screws.
2) Remove the Duplex motor cover.
3) Remove the Duplex motor.

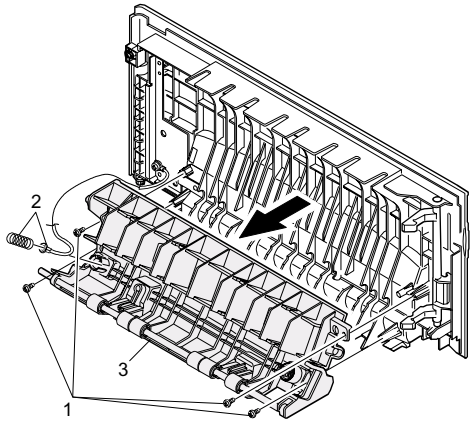


Note: When reassembling, be sure to engage the Duplex motor gear with the belt on the main body side.

12.Reverse roller section (RSPF model only)

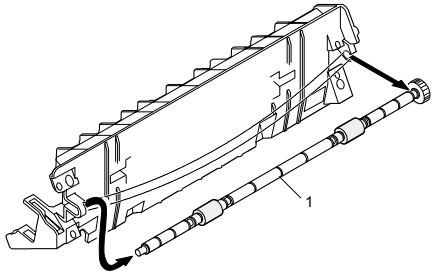
A. Remove the reverse unit.

1) Remove four screws
2) Remove the spring, and the earth wire
3) Remove the reverse unit.



B. Remove the reverse roller.

1) Bend the reverse roller and remove it.



13.RSPF section (RSPF model only)

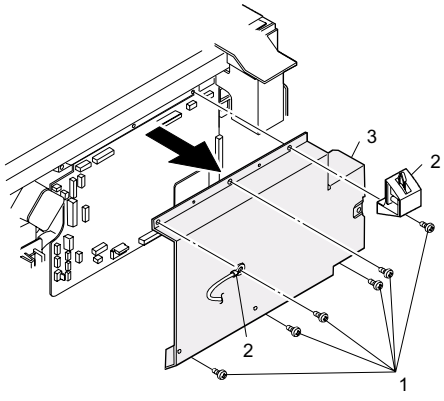
A. RSPF

(1) Remove the rear cabinet.

1) Remove four screws.
2) Remove the rear cabinet.

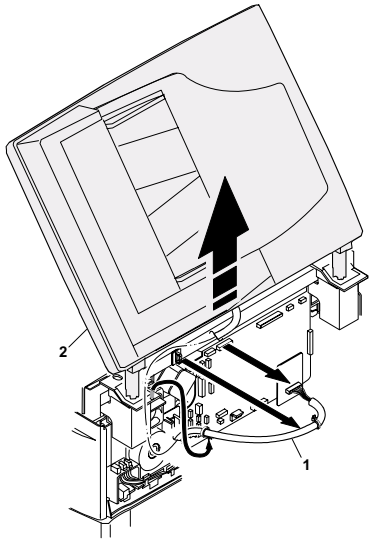
(2) Remove the shield plate.

1) Remove six screws.
2) Remove the open/close detection unit, and the earth wire.
3) Remove the shield plate.



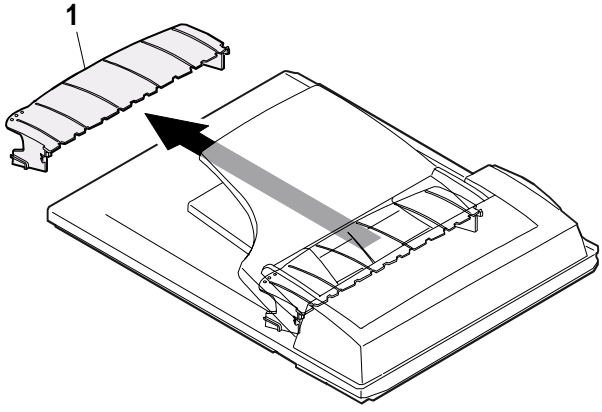
(3) Remove the RSPF.

1) Remove the connector and the cable.
2) Remove the RSPF.



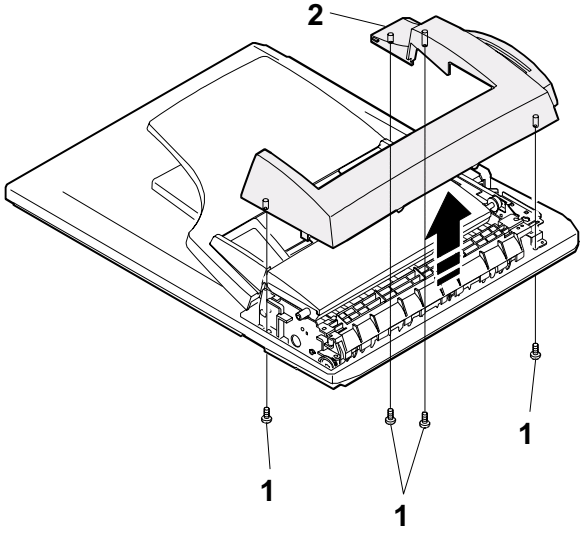
B. Intermediate tray

1) Remove the intermediate tray.



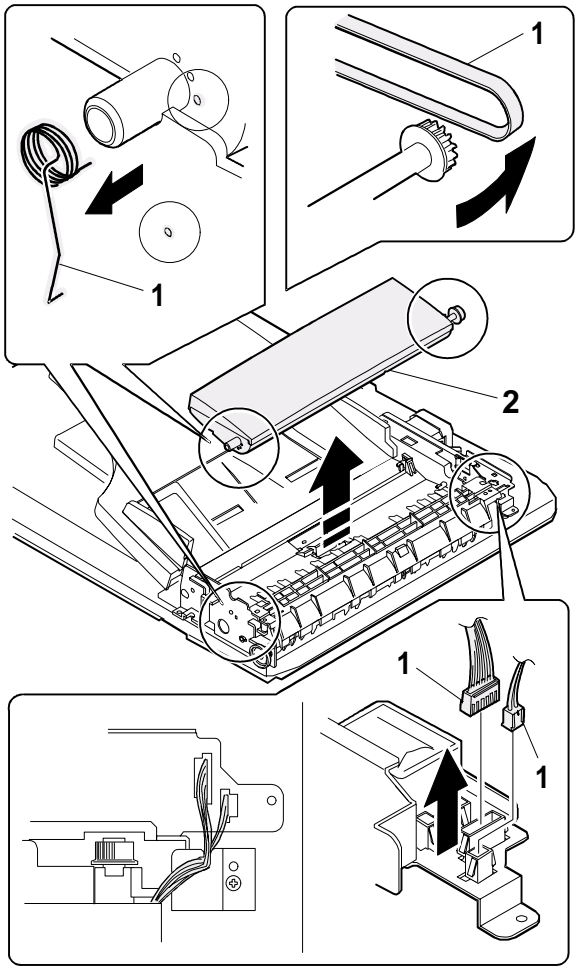
C. Upper cover

1) Remove four screws from the bottom of the main body.
2) Remove the upper cover.



D. Pickup unit

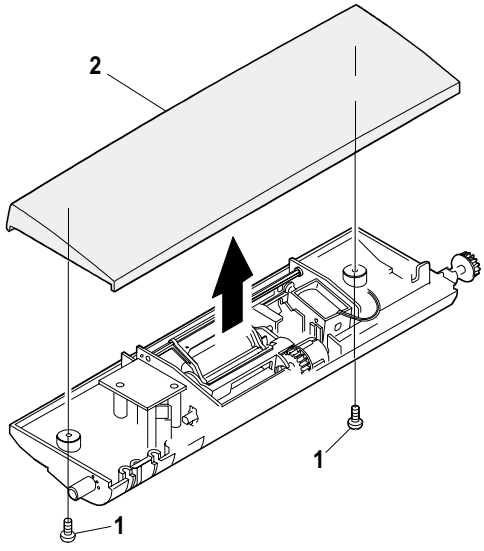
1) Remove the belt, the paper feed frame spring, and two harnesses.
2) Remove the pickup unit.



Note: When reassembling, be careful of the hole position for the paper feed frame spring.

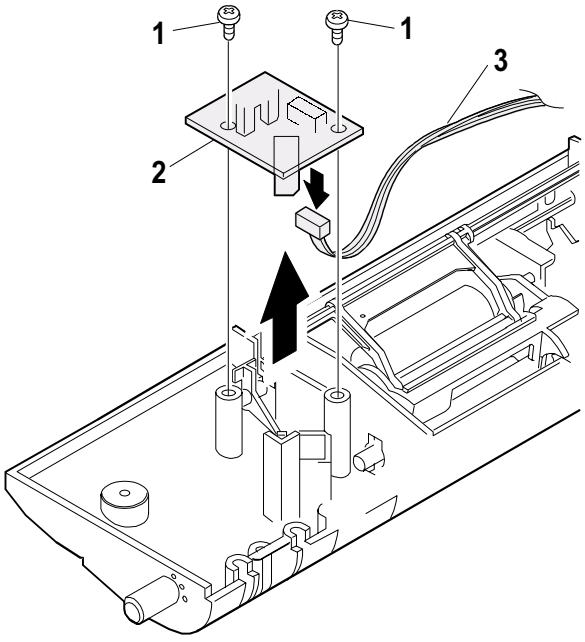
E. Upper cover of the pickup unit.

1) Remove two screws from the bottom of the pickup unit.
2) Remove the upper cover.



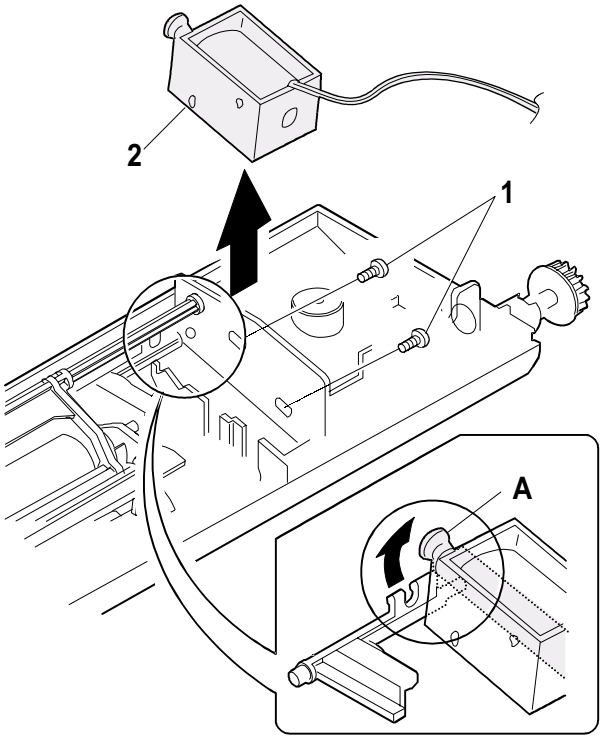
F. Sensor PWB

1) Remove two screws.
2) Remove the sensor PWB.
3) Remove the harness.



G. Pickup solenoid

1) Remove two screws.
2) Remove the pickup solenoid.

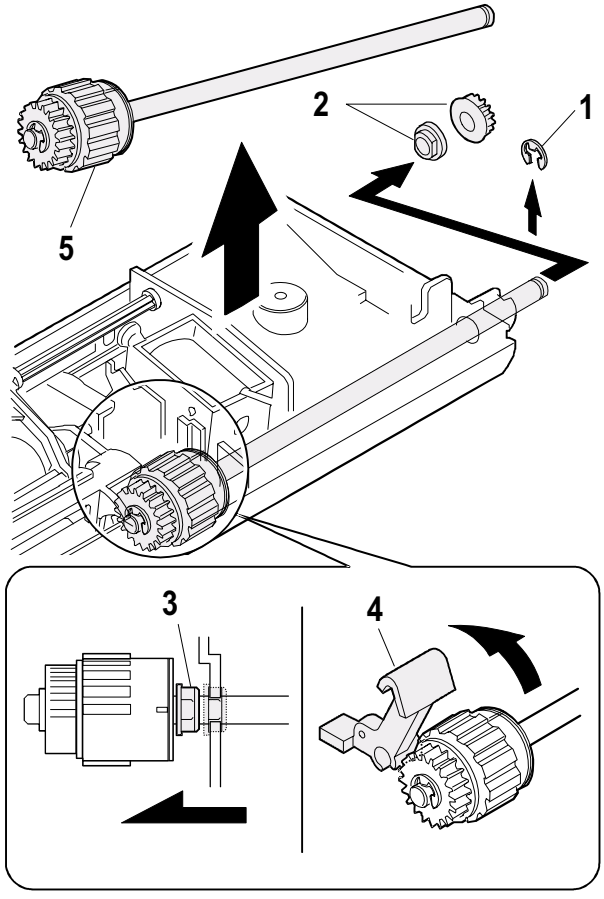


Note: When reassembling, hang the iron core on the solenoid arm.

H. Clutch

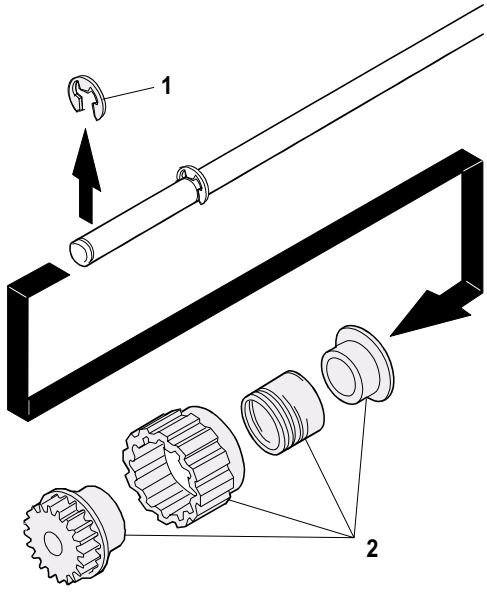
(1) Remove the clutch unit.

1) Remove the E-ring.
2) Remove the pulley and the bush.
3) Slide the bush in the arrow direction.
4) Lift the clutch pawl.
5) Remove the clutch unit.



(2) Remove the clutch

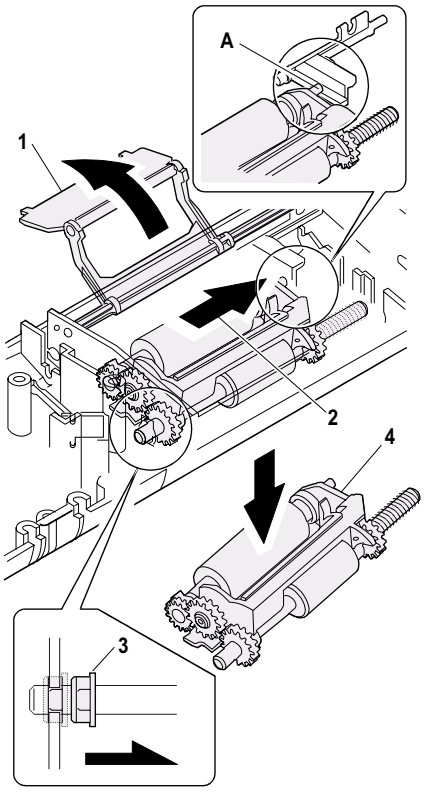
1) Remove the E-ring.
2) Remove the parts.



I. Manual paper feed roller, pickup roller

(1) Remove the pickup unit.

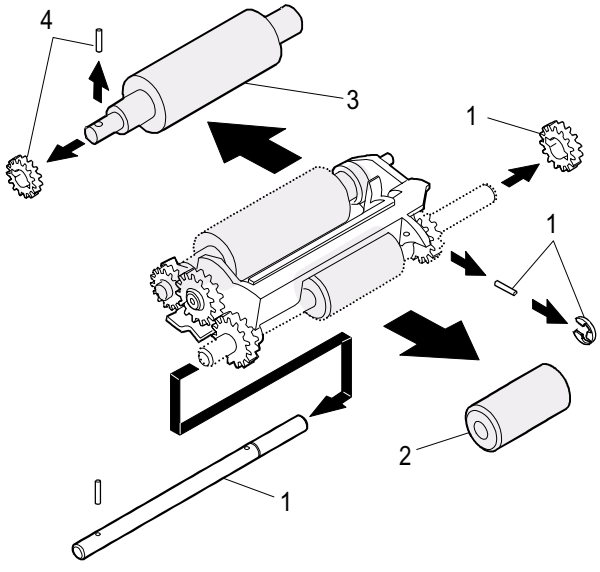
1) Lift the paper stopper.
2) Slide the takeup roller unit.
3) Slide the bushing in the arrow direction.
4) Remove the takeup roller.



Note: When reassembling, hang the convex portion of the roller unit on the solenoid arm.

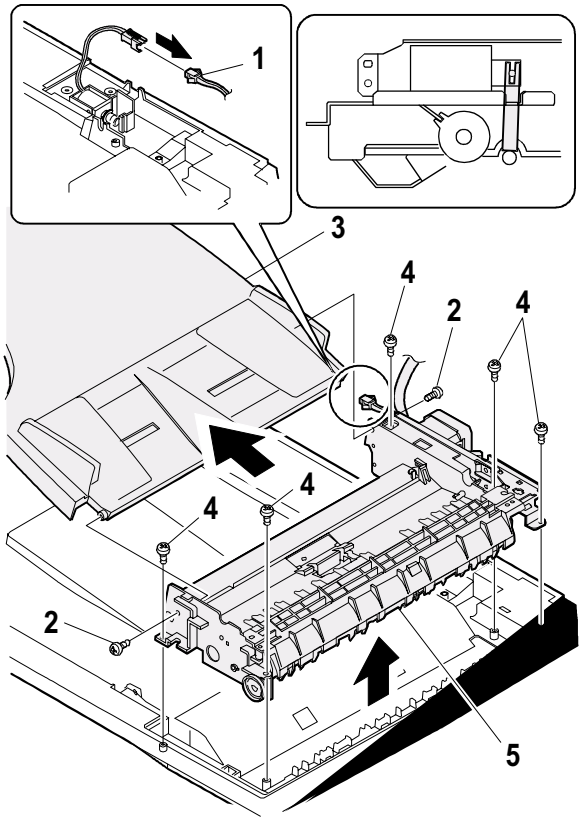
(2) Remove the Manual paper feed roller, pickup roller.

1) Remove the parts.
2) Remove the manual paper feed roller.
3) Remove the pickup roller.
4) Remove the parts.



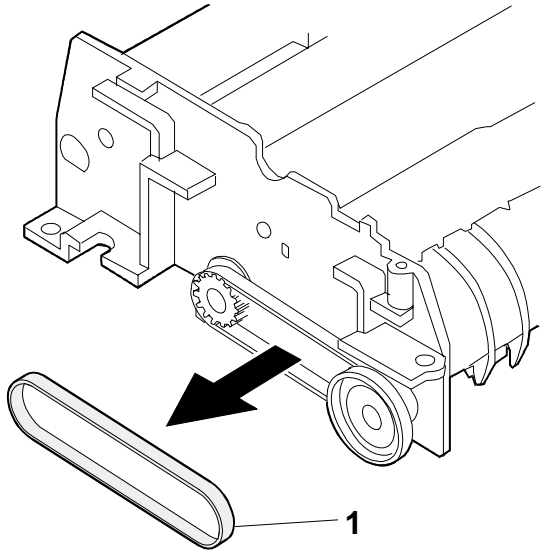
J. Transport unit removal

1) Remove the harness.
2) Remove two screws.
3) Remove the document tray unit.
4) Remove five screws.
5) Remove the transport unit.



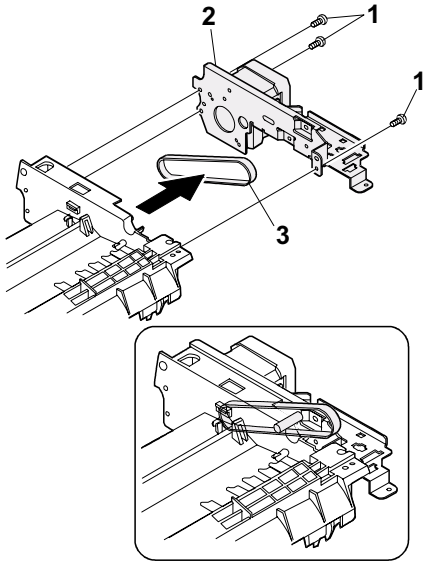
K. Belt 1

1) Remove the belt.



L. Belt 2

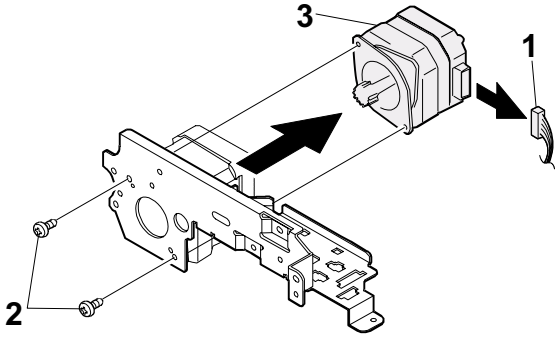
1) Remove three screws.
2) Remove the drive unit.
3) Remove the belt.



Note: When reassembling, hang the belt on the boss.

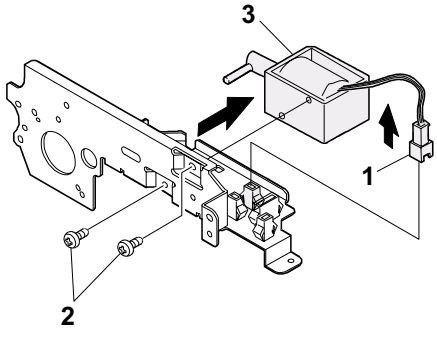
M. SPF motor

1) Remove the harness.
2) Remove two screws.
3) Remove the SPF motor.



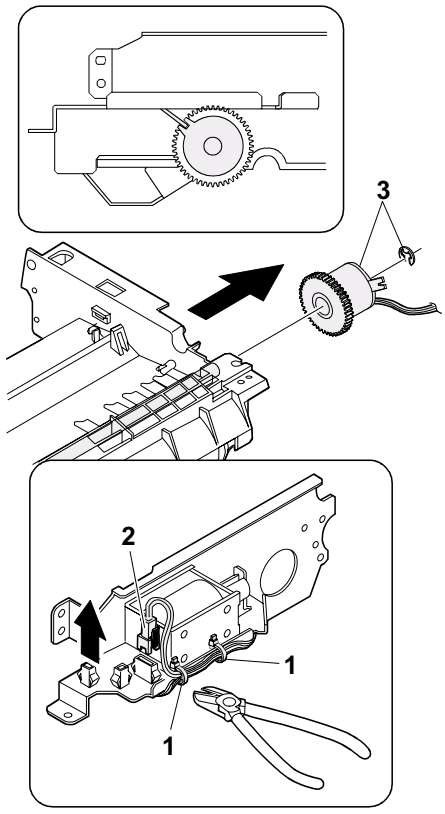
N. Solenoid

1) Remove the harness.
2) Remove two screws.
3) Remove the solenoid.



O. Clutch

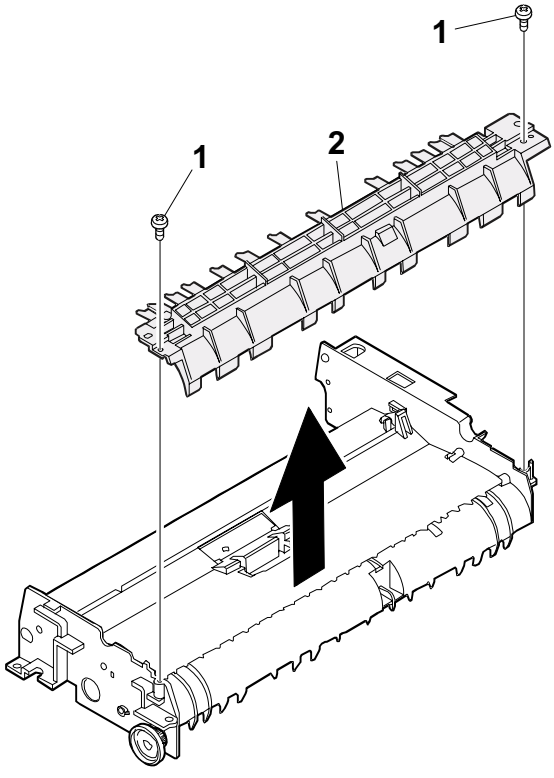
1) Cut the band with nippers.
2) Remove the harness.
3) Remove the clutch.



P. Paper supply roller

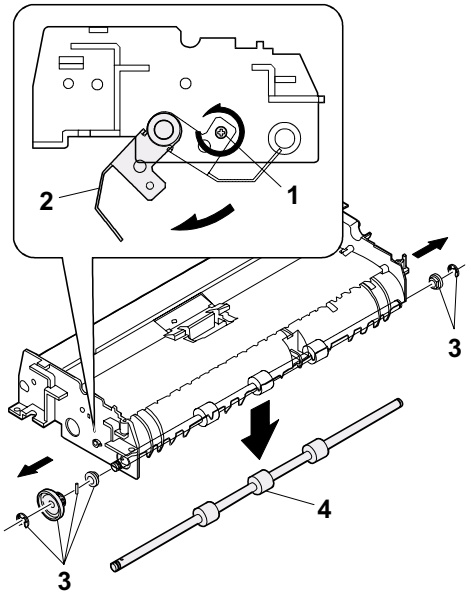
(1) Remove the parts.

1) Remove the two screws.
2) Remove the parts.



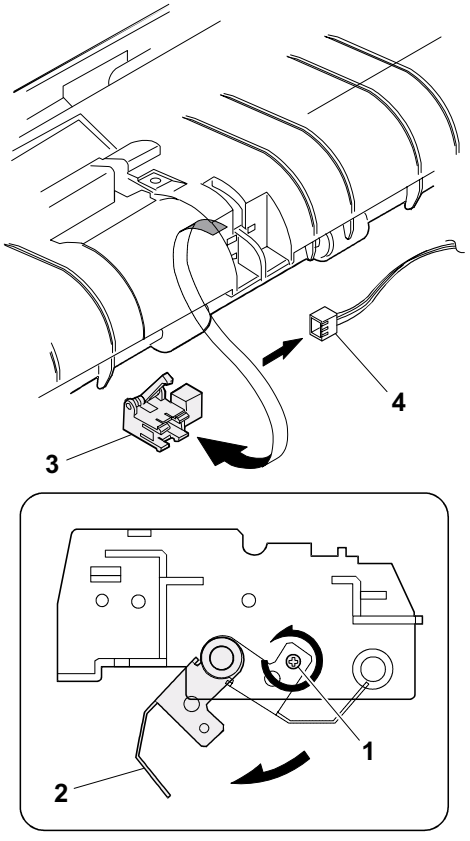
(2) Remove the paper supply roller.

1) Loosen the screw.
2) Open the paper exit paper guide.
3) Remove the parts.
4) Remove the paper supply roller.



Q. Paper entry sensor

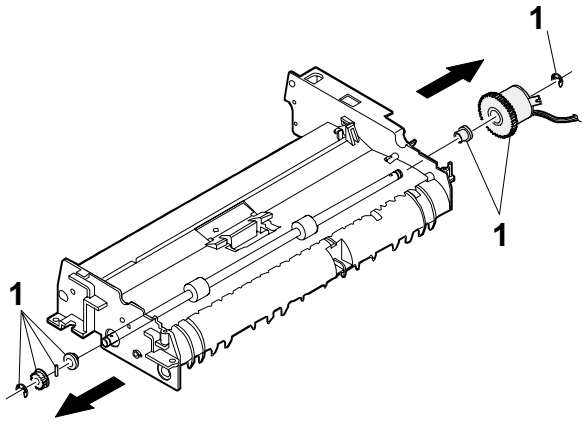
1) Loosen the screw.
2) Open the paper exit paper guide.
3) Remove the paper entry sensor.
4) Remove the harness.



R. Transport roller1.

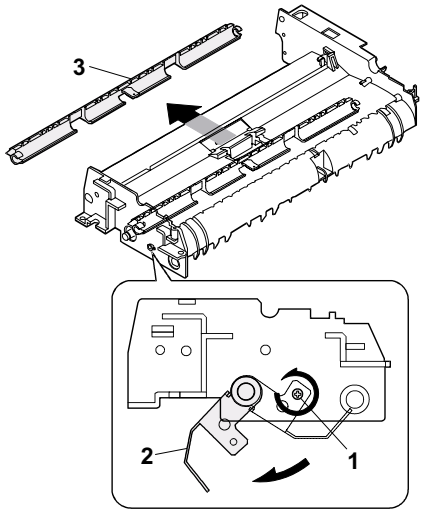
(1) Remove the parts.

1) Remove the parts.



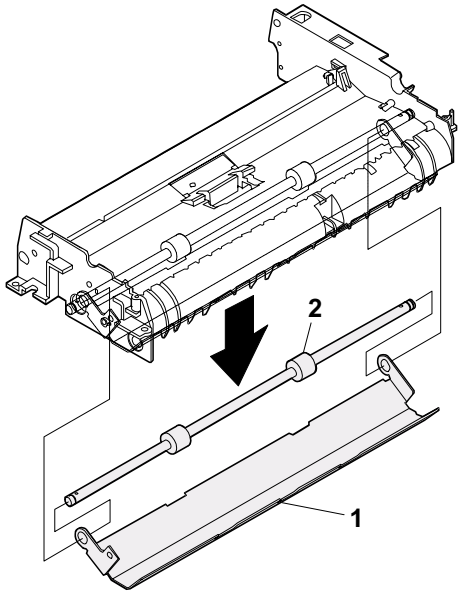
(2) Remove the parts.

1) Loosen the screw.
2) Open the paper exit paper guide.
3) Remove the parts.



(3) Remove the transport roller.

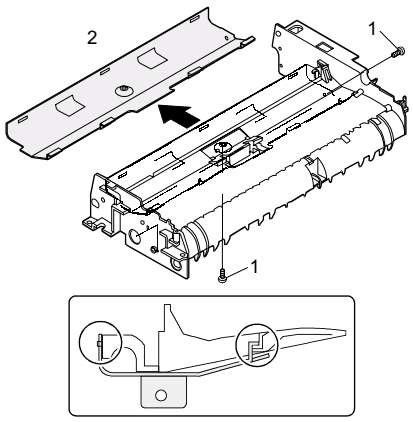
1) Remove the paper exit paper guide.
2) Remove the transport roller.



S. Paper exit roller

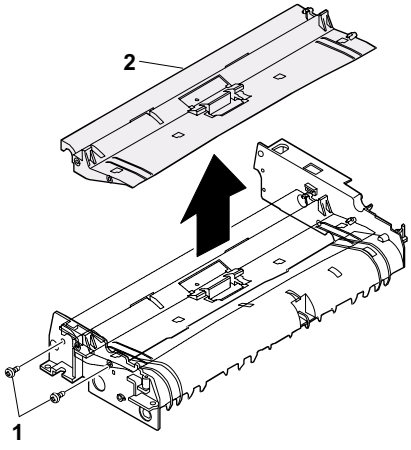
(1) Remove the parts.

1) Remove two screws.
2) Remove the parts.



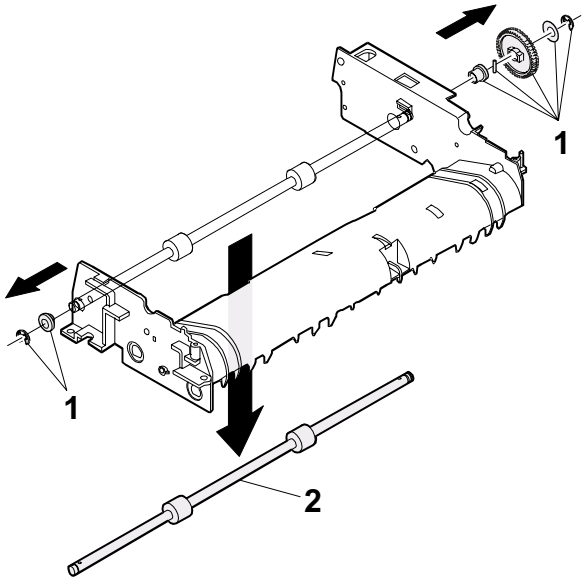
(2) Remove the paper feed paper guide upper.

1) Remove two screws.
2) Remove the paper feed paper guide upper.



(3) Remove the paper exit roller.

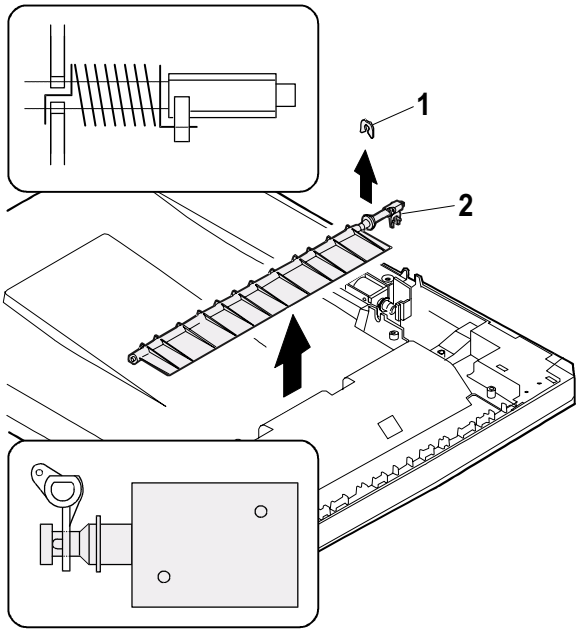
1) Remove the parts.
2) Remove the paper exit roller.



T. Solenoid

(1) Remove the reverse gate

1) Remove the ring
2) Remove the reverse gate

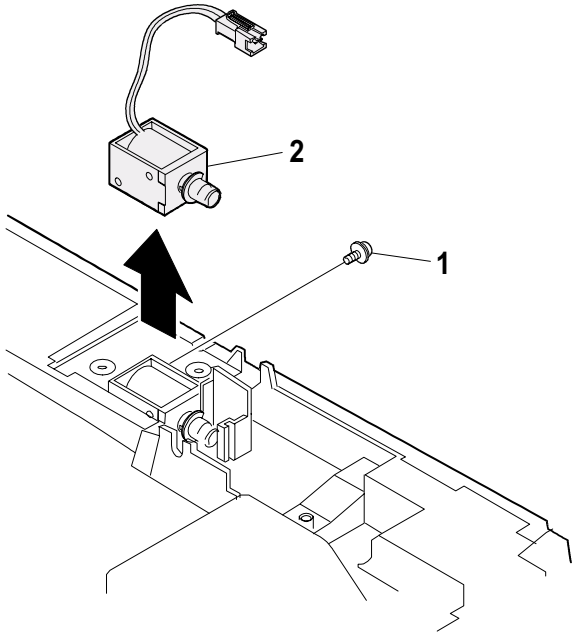


Note: When reassembling, be careful of the groove and the hole positions of the spring.

Note: When reassembling, hang 2) on the solenoid.

(2) Remove the solenoid.

1) Remove the screw.
2) Remove the solenoid.



[9] ADJUSTMENTS

1. Optical section

A. Image distortion adjustment

There are two types of image distortion.

- Horizontal image distortion
- Vertical image distortion

In this machine, the image distortion is adjusted by changing the parallelism of mirrors (copy lamp unit, No. 2/3 mirror unit).

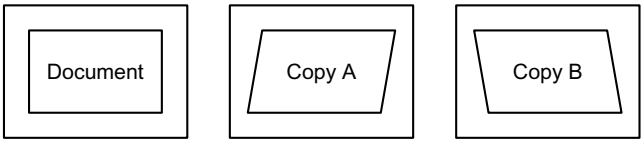
(1) Horizontal image distortion adjustment

a. Summary

Parallelism of mirrors can be made by installing the copy lamp unit and No. 2/3 mirror unit to the reference position. However, it must be checked by making a copy, and must be adjusted if necessary.

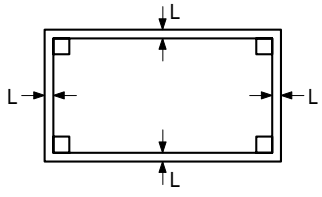
b. Cases when the adjustment is required

1) When the copy lamp unit and No.2/3 mirror unit are disassembled or their part is replaced.
2) When the copy lamp unit and No.2/3 mirror unit drive section is disassembled or its part is replaced.
3) When the copy image is distorted as shown below:



c. Necessary tools

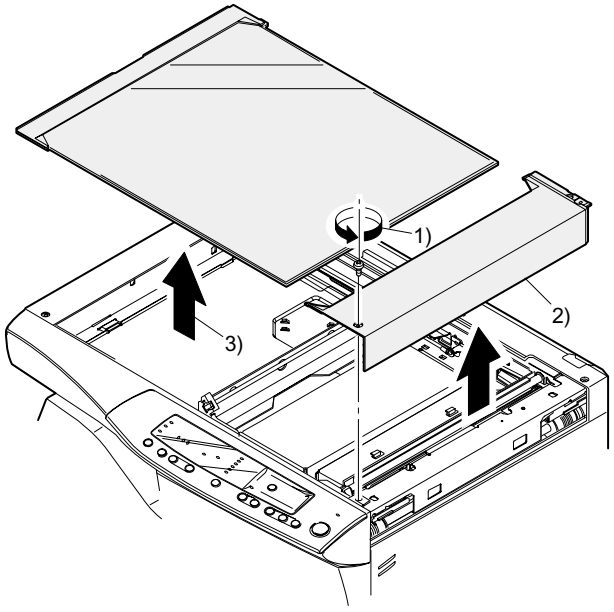
- Screwdriver (+)
- Hex wrench
- Scale
- Test chart for distortion adjustment (Make a chart shown below by yourself.)
  Draw a rectangle on a paper (B4 or 8 1/2" x 14") as shown below.
  Be sure to make four right angles.



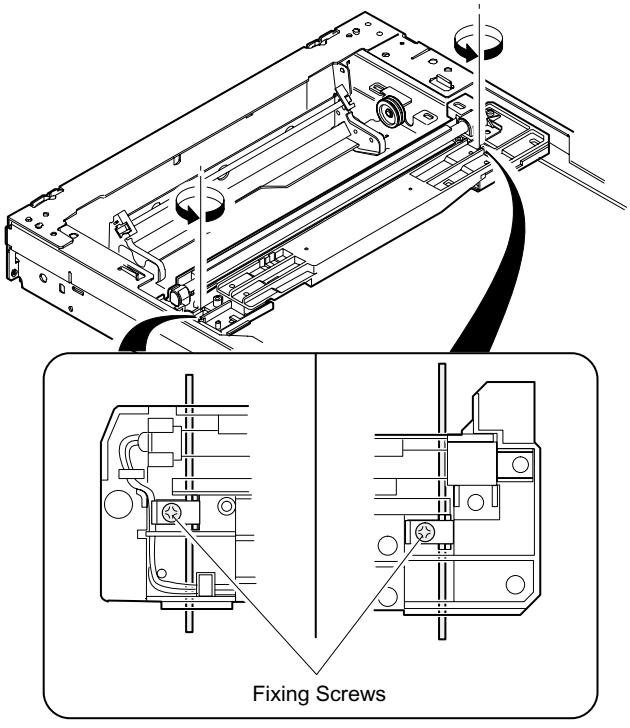
L = 10mm

d. Adjustment procedure

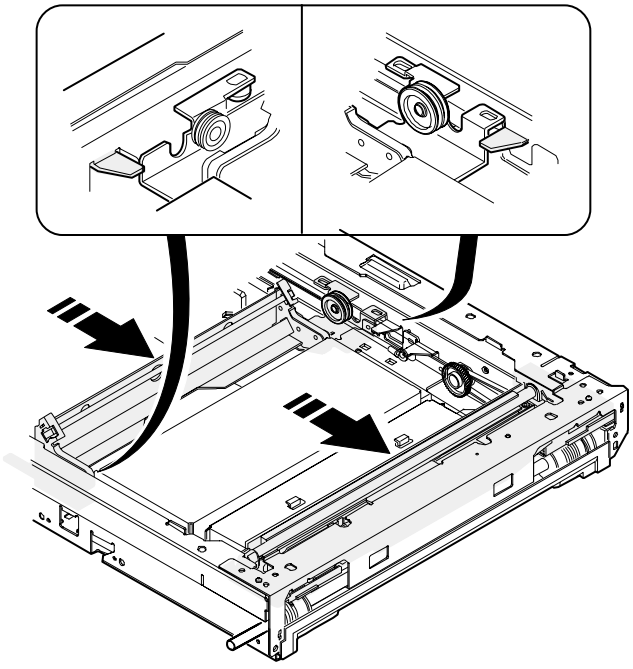
1) Remove the right cabinet (manual paper feed unit), the document reference plate.
2) Remove the document glass.



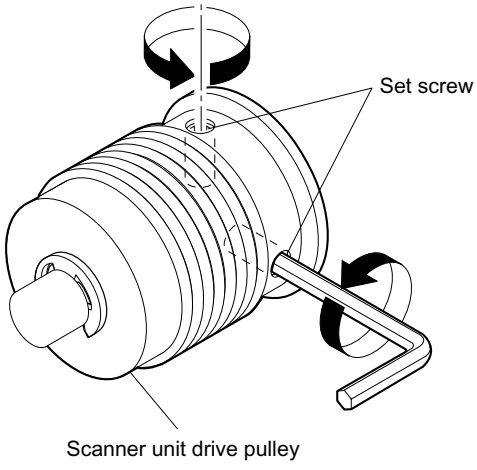
3) Loosen the fixing screw of the copy lamp unit wire.



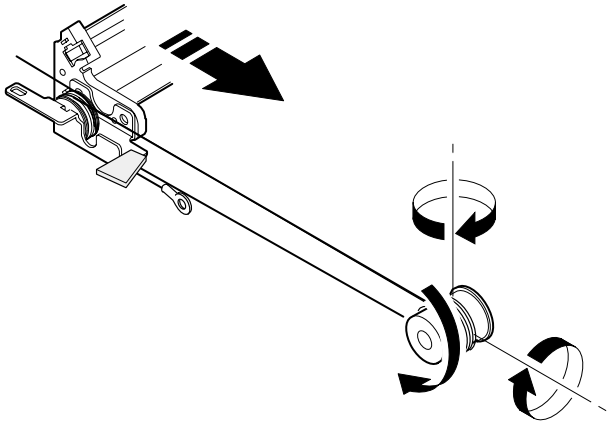
4) Manually turn the copy lamp unit/No.2/3 mirror unit drive gear to bring No.2/3 mirror unit into contact with No.2/3 mirror unit positioning plate. When No.2/3 mirror unit makes contact with No.2/3 mirror unit positioning plate in the rear frame side simultaneously, the mechanical parallelism of No.2/3 mirror unit is proper.
If one side of No.2/3 mirror unit makes contact with No.2/3 mirror unit positioning plate and the other side does not, the parallelism is improper.
If the parallelism is improper, perform the procedure of step 5).



5) Loosen the copy lamp unit/No.2/3 mirror unit drive pulley setscrew in the side where No.2/3 mirror unit does not make contact with No.2/3 mirror unit positioning plate.

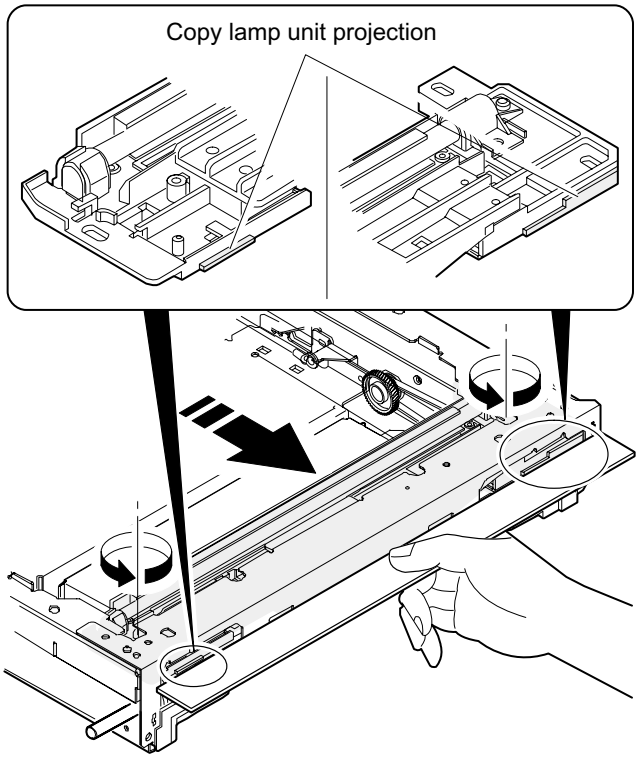


6) Without moving the copy lamp unit/No.2/3 mirror unit drive pulley shaft, manually turn the copy lamp unit/No.2/3 mirror unit drive pulley in the same direction of the loosened setscrew.
When it makes contact with No.2/3 mirror unit positioning plate, tighten and fix the setscrew.

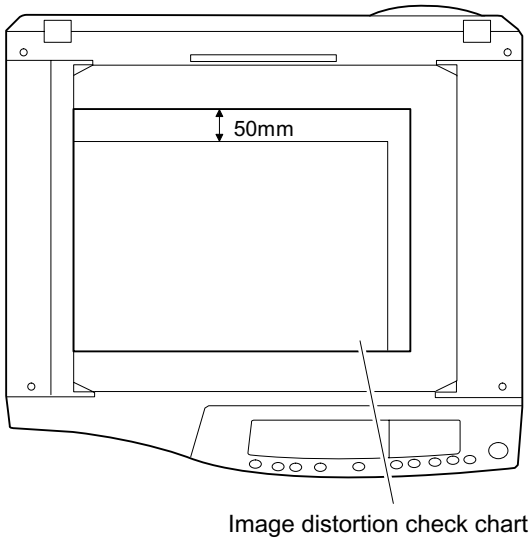


7) Manually turn the copy lamp unit/No.2/3 mirror unit drive gear to bring No.2/3 mirror unit into contact with the positioning plate, and perform the procedure of step 4).
Repeat procedures of steps 4) to 7) until the parallelism of No.2/3 mirror unit is properly set.

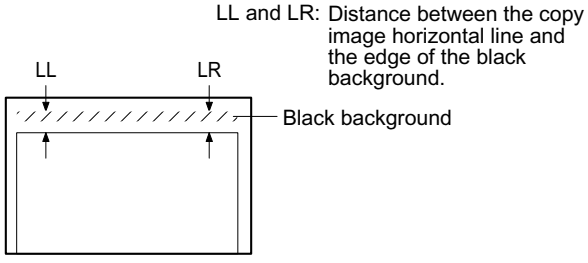
8) With No.2/3 mirror unit positioning plate in contact with No.2/3 mirror unit, bring the copy lamp unit into contact with the right frame and fix the copy lamp unit to the drive wire.
Procedures 1) to 8) are for adjustment of mechanical horizontal parallelism. The copy lamp unit and No.2/3 mirror are fixed to the specified positions and the mechanical horizontal parallelism of No.2/3 mirror is adjusted.
Then the optical horizontal parallelism must be adjusted in the following procedures.



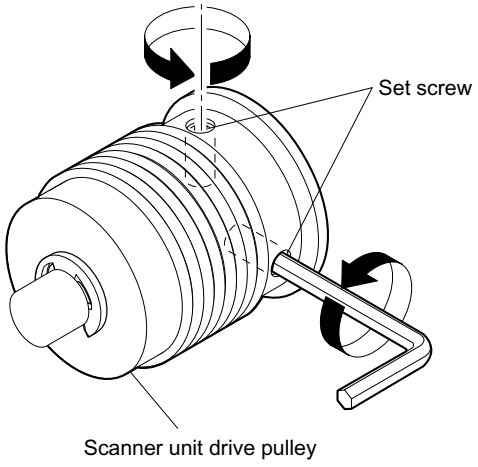
9) Set the image distortion check chart on the document table, and make a reduction copy (75%) on an A4 or 11" x 8 1/2" paper with the document cover open.



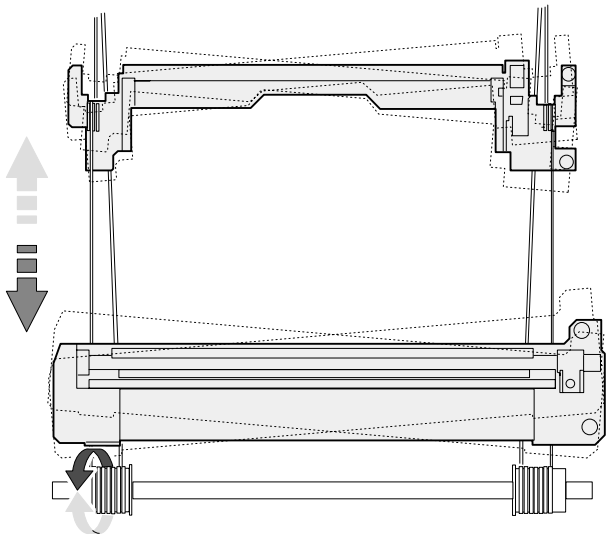
10) Check the horizontal image distortion.
If LL = LR, there is no horizontal distortion



11) If LL is not equal to LR, perform the following procedure.
Loosen the setscrew of the copy lamp unit/No.2/3 mirror unit drive pulley in the front or the rear frame.



12) Without moving the copy lamp unit/No.2/3 mirror unit drive pulley shaft, manually turn the copy lamp unit/No.2/3 mirror unit drive pulley whose setscrew was loosened, and adjust the parallelism of copy lamp unit/No.2/3 mirror unit.



13) Tighten the set screw of the copy lamp unit/No.2/3 mirror unit drive pulley.
14) Check the image distortion in the same manner as step 10).
Repeat procedures 11) to 14) until horizontal image distortion is eliminated.

(2) Vertical image distortion adjustment

a. Summary

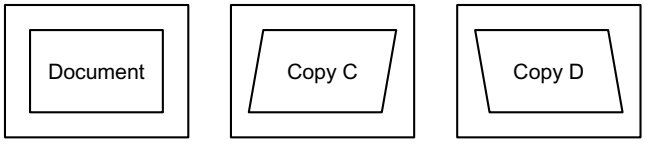
In this adjustment, the left and right balance is adjusted by changing the left and right balance of the No. 2 scanner unit frame on the front frame side.

b. Note

• Horizontal image distortion adjustment

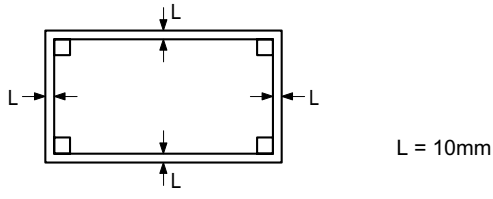
c. Cases when the adjustment is required

1) When the copy lamp unit/No.2/3 mirror unit drive section is disassembled or its part is replaced.
2) When the copy image is distorted as follows:d. Necessary tools



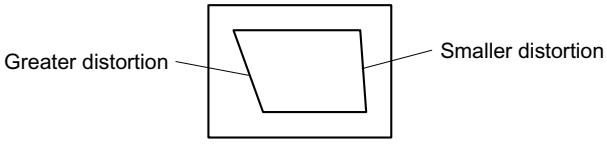
d. Necessary tools

• Screwdriver (+)
• Screwdriver (-)
• Scale
• Test chart for distortion adjustment (Make by yourself.)
Draw a rectangle on A4 or 8 1/2" x 11" paper as shown below:
Be sure to make four right angles.

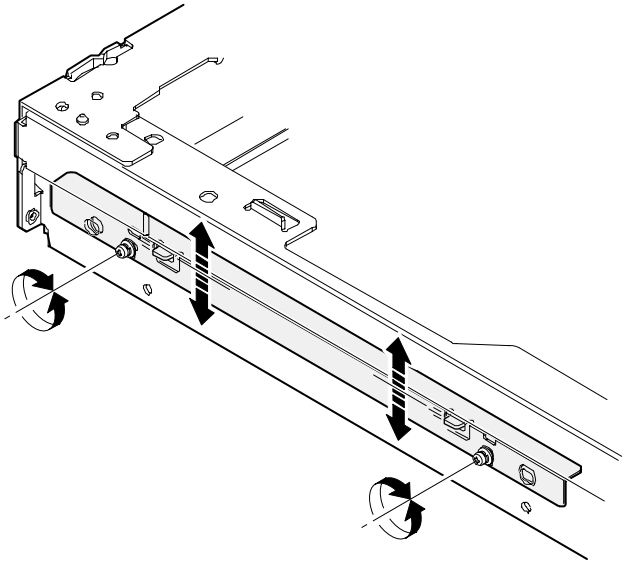


e. Adjustment procedure

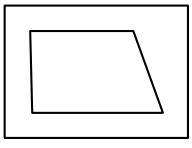
1) Set the test chart for image distortion adjustment on the document glass, and make a normal copy on a paper of A4 or 8 1/2" x 11".
2) Check image distortion in the right and the left sides.
   If both vertical lines are in parallel with each other, the right and left distortion balance is proper. (However, there may be some distortion.)
   If all the four angles are right angles, there in no distortion and the following procedures are not required.



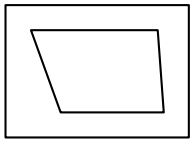
3) If the right-left distortion balance is improper, loosen the fixing screw of No.2/3 mirror unit rail to change and adjust the righ and left balance of No.2/3 mirror unit rail.



Note: If the distortion in the lead edge side (when viewed in the paper transport direction) is greater, change the height of the left rail of No.2/3 mirror unit.
If the distortion in the rear edge side (when viewed in the paper transport direction) is greater, change the height of the right rail of No.2/3 mirror unit.

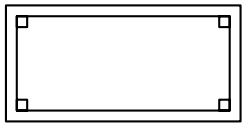


Change the height
of the right side of the rail .



Change the height
of the left side of the rail .

4) Make a copy to check the vertical image distortion.
   If the four angles are right angles, the adjustment is completed.



B. Copy magnification ratio adjustment

The copy magnification ratio must be adjusted in the main scanning direction and in the sub scanning direction. To adjust, use SIM 48-1.

(1) Outline

The main scanning (front/rear) direction magnification ratio adjustment is made automatically or manually.
Automatic adjustment: The width of the reference line marked on the shading correction plate is scanned to perform the main scanning (front/rear) direction magnification ratio adjustment automatically.
Manual adjustment: The adjustment is made by manual key operations. (In either of the automatic and manual adjustments, the zoom data register set value is changed for adjustment.)
The magnification ratio in the sub scanning direction is adjusted by changing the mirror base (scanner) scanning speed.

(2) Main scanning direction magnification ratio adjustment

a. Note

Before performing this adjustment, the following adjustments must have been completed. If not, this adjustment cannot be performed properly.

- Image distortion adjustment
- The lens unit must be installed in the reference position.

b. Cases when the adjustment is required

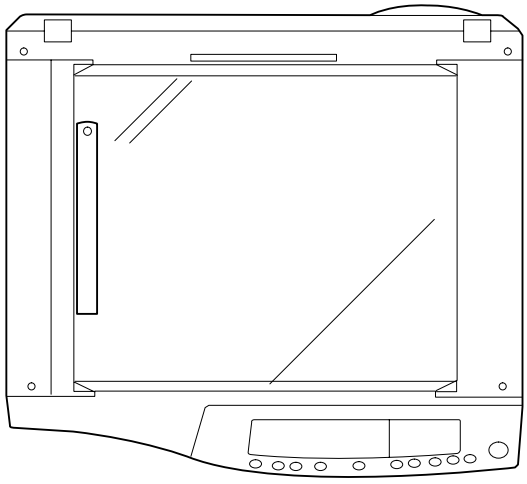
1) When the lens and the mirror unit are disassembled or the part is replaced.
2) When the copy lamp unit/No.2/3 mirror unit drive section is disassembled or the part is replaced.
3) When the main PWB is replaced.
4) When the EEPROM in the main PWB is replaced.
5) When "U2" trouble occurs.
6) When the copy image distortion adjustment is performed.

c. Necessary tools

- Screwdriver (+)
- Scale

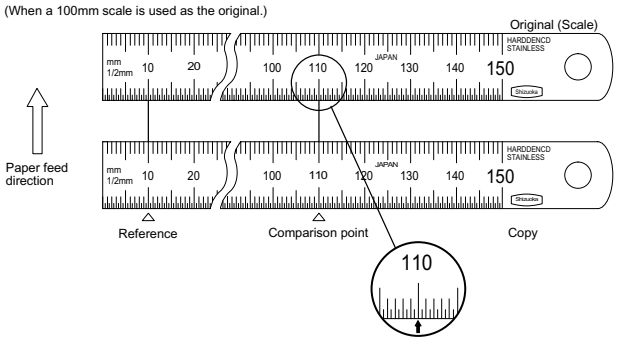
d. Adjustment procedure

1) Set the scale vertically on the document table. (Use a long scale for precise adjustment.)



2) Set the copy magnification ratio to 100%.
3) Make a copy on A4 or 81/2" x 11" paper.
4) Measure the length of the copied scale image.
5) Calculate the main scanning direction magnification ratio.
   Main scanning direction magnification ratio

$$= \frac{\text{Copy image dimensions}}{\text{Original dimension}} \times 100\ (\%)$$



6) Check that the copy magnification ratio is within the specified range. If it is not within the specified range, perform the following procedures.
7) Execute SIM 48-1 to select the main scanning direction copy magnification ratio adjustment mode.
   To select the adjustment mode, use the copy mode select key.

In the case of the automatic adjustment, when the PRINT switch is pressed, the mirror base unit moves to the white plate for shading to scan the width of the reference line, calculating the correction value and displaying and storing this value.
After execution of the automatic adjustment, go out from the simulation mode and make a copy to check the magnification ratio.
If the magnification ratio is not in the specified range (100±1.0%), manually adjust as follows.

Adjustment mode	Lighting lamp
Main scanning direction auto copy magnification ratio adjustment	Auto exposure lamp ON
Main scanning direction manual copy magnification ratio adjustment	Manual exposure lamp ON
Sub scanning direction copy magnification ratio adjustment	Photo exposure lamp ON

8) Set the adjustment mode to Manual with the copy mode select key.
9) Enter the new set value of main scanning direction copy magnification ratio with the copy quantity set key, and press the COPY button.
10) Change the set value and repeat the adjustment until the ratio is within the speoified range.
    When the set value is changed by 1, the magnification ratio is changed by 0.1%.

(3) Sub scanning direction copy magnification ratio

a. Note

Before performing this adjustment, the following adjustments must have been completed. If not, this adjustment cannot be performed properly.

- Image distortion adjustment
- Must be installed to the lens unit reference position.

b. Cases when the adjustment is required

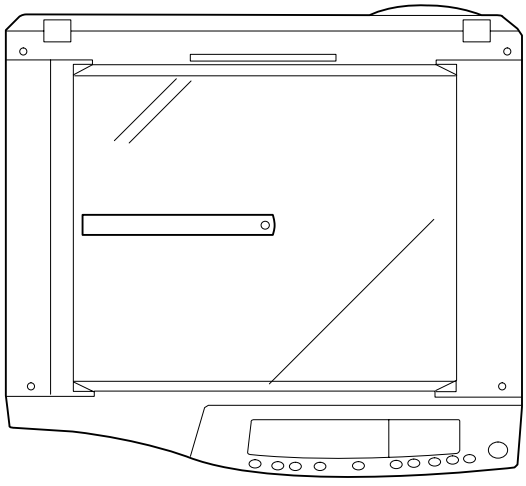
1) When the lens and the mirror unit are disassembled or the part is replaced.
2) When the scanner unit drive section is disassembled or the part is replaced.
3) When the main PWB is replaced.
4) When the EEPROM in the main PWB is replaced.
5) When "U2" trouble occurs.
6) When the copy image distortion adjustment is performed.

c. Necessary tools

- Screwdriver (+)
- Scale

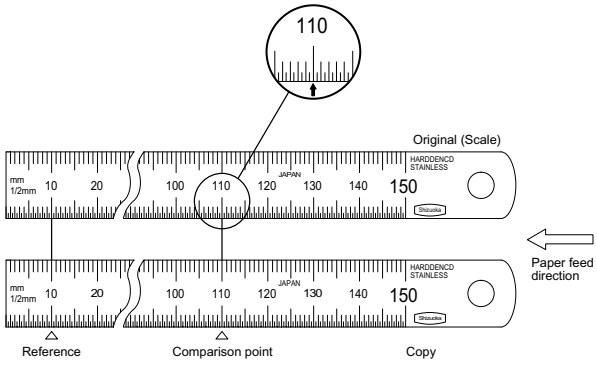
d. Adjustment procedure

1) Set the scale on the document table as shown below. (Use a long scale for precise adjustment.)



2) Set the copy magnification ratio to 100%.
3) Make a copy on A4 or 81/2" x 11" paper.
4) Measure the length of the copied scale image.
5) Calculate the sub scanning direction copy magnification ratio.
   Sub scanning direction copy magnification ratio

$$= \frac{\text{Copy image dimensions}}{\text{Original dimension}} \times 100\ (\%)$$



6) Check that the actual copy magnification ratio is within the specified range. (100 ± 1.0%).
If it is not within the specified range, perform the following procedures.

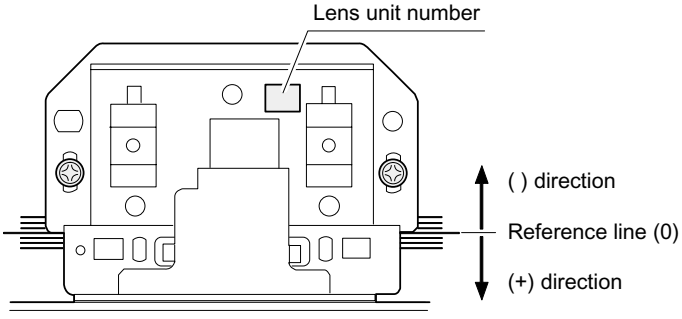
7) Execute SIM 48-1 to select the sub scanning direction copy magnification ratio adjustment mode.
To select the adjustment mode, use the copy mode select key. (Photo exposure lamp ON)

8) Enter the new set value of sub scanning direction copy magnification ratio with the copy quantity set key, and press the COPY button.

Repeat procedures 1) - 8) until the sub scanning direction actual copy magnification ratio in 100% copying is within the specified range.
When the set value is changed by 1, the magnification ration is changed by 0.1%.

C. Lens unit attachment reference

Attach the lens unit so that the lens unit number on the lens adjustment plate is aligned with the scribe line on the base plate.



Example: Lens unit number -2.8
Attach the lens unit at 2 scales in the paper exit direction from the reference line.

Note: Never touch the other screws than the unit attachment screw.
The lens unit is supplied only in a whole unit.

D. Image position adjustment

There are following five kinds of image position adjustments, which are made by laser control except for the image scan start position adjustment. For the adjustments, SIM 50 - 01 and SIM 50 - 10 are used.

No.	Adjustment item	Simulation
1	Print start position	50 - 01
2	Image lead edge void amount	50 - 01
3	Image scan start position	50 - 01
4	Image rear edge void amount	50 - 01
5	Center offset	50 - 10

To select the adjustment mode with SIM 50 - 01, use the copy density select key.
The relationship between the adjustment modes and the lighting lamps are as shown in the table below.

Adjustment mode	Lighting lamp
Print start position	Auto (AE) lamp
Image lead edge void amount	Manual (TEXT) lamp
Image scan start position	Photo lamp
Image rear edge void amount	Auto, Manual, Photo lamps

To select the adjustment mode with SIM 50 - 10, use the copy mode select key.
The relationship between the adjustment modes and the lighting lamps are as shown in the table below.

Machine with the multi manual paper feed unit

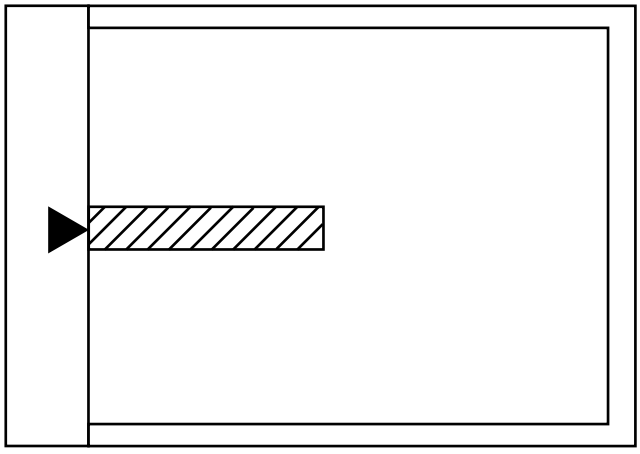
Adjustment mode	Lighting lamp
Print center offset (cassette)	Auto, Cassette
Print center offset (manual feed)	Auto, Manual
Document center offset	Auto, Manual

Machine with the single manual paper feed unit

Print center offset (cassette)	Auto, Cassette
Print center offset (manual feed)	Auto
Document center offset	Auto, Manual

(1) Lead edge adjustment

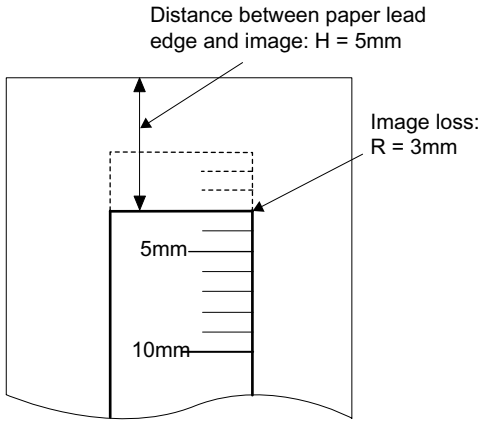
1) Set a scale to the center of the paper lead edge guide as shown below, and cover it with B4 or 8 1/2" x 14" paper.



2) Execute SIM 50 - 01
3) Set the print start position (AE lamp ON) (A), the lead edge void amount (TEXT lamp ON) (B), and the scan start position (PHOTO lamp ON) (C) to 0, and make a copy of a scale at 100%.
4) Measure the image loss amount (R mm) of the scale image.
Set C = 10 X R (mm). (Example: Set the value of C to 30.)
When the value of C is increased by 10, the image loss is decreased by 1mm. (Default: 50)
5) Measure the distance (H mm) between the paper lead edge and the image print start position.
Set A = 10 X H (mm). (Example: Set the value of A to 50.)
When the value of A is increased by 10, the image lead edge is shifted to the paper lead edge by 1mm. (Default: 50)

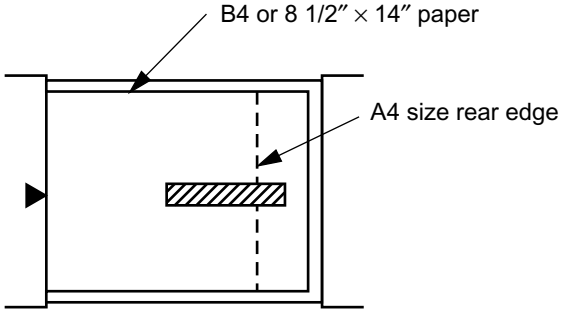
6) Set the lead edge void amount to B = 50 (2.5mm).
When the value of B is increased by 10, the void amount is increased by about 1mm. For 25 or less, however, the void amount becomes zero. (Default: 50)

(Example)

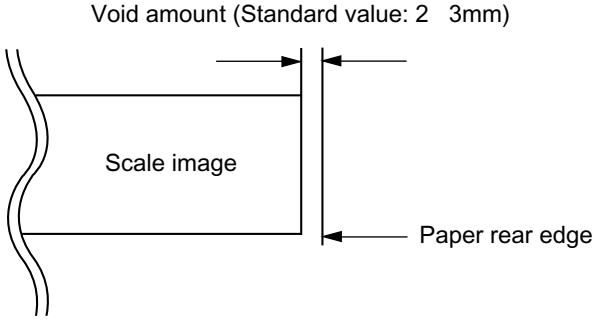


(2) Image rear edge void amount adjustment

1) Set a scale to the rear edge section of A4 or 11" x 8 1/2" paper size as shown in the figure below, and cover it with B4 or 8 1/2" x 14" paper.



2) Execute SIM 50 - 01 to select the image rear edge void amount adjustment mode.
The set adjustment value is displayed on the copy quantity display.
3) Make a copy and measure the void amount of image rear edge.



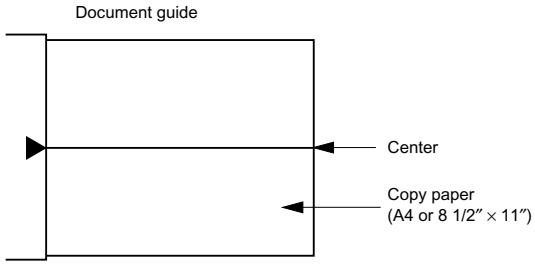
4) If the measurement value is out of the specified range, change the set value and repeat the adjustment procedure.
The default value is 50.

Note: The rear edge void cannot be checked with the first sheet after entering the simulation mode, the first sheet after turning off/on the power, or the first sheet after inserting the cassette. Use the second or later sheet to check the rear edge void.

(3) Center offset adjustment

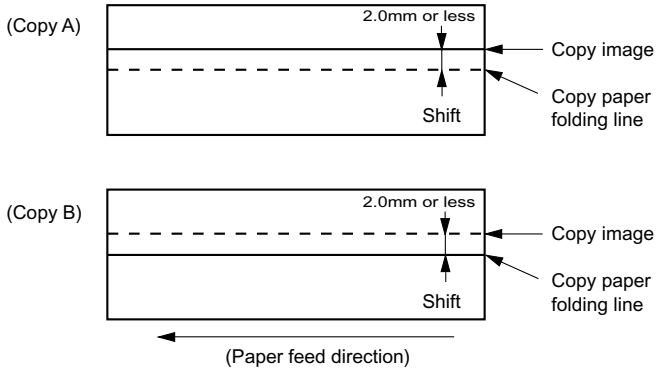
1) Set the self-made test chart for the center position adjustment so that its center line is aligned with the center mark of the document guide.

• Test chart for the center position adjustment.
Draw a line at the center of A4 or 8 1/2" x 11" paper in the paper transport direction.



2) Execute SIM 50 - 10 to select the print center offset (cassette paper feed) adjustment mode.
The set adjustment value is displayed on the copy quantity display.

3) Make a copy and check that the copied center line is properly positioned.
The standard value is 0 ±2mm from the paper center.



4) If the measured value is out of the specified range, change the set value and repeat the adjustment procedure.
When the set value is increased by 1, the copy image is shifted by 0.1mm toward the rear frame.

• For the manual paper feed, change the manual paper feed adjustment mode and perform the similar procedures.

• Since the document center offset is automatically adjusted by the CCD which scan the reference lines (F/R) on the back of document guide, there is no need to adjust manually.

2. Copy density adjustment

A. Copy density adjustment timing

The copy density adjustment must be performed in the following cases:

- When maintenance is performed.
- When the developing bias/grid bias voltage is adjusted.
- When the optical section is cleaned.
- When a part in the optical section is replaced.
- When the optical section is disassembled.
- When the OPC drum is replaced.
- When the main control PWB is replaced.
- When the EEPROM on the main control PWB is replaced.
- When the memory trouble (U2) occurs.

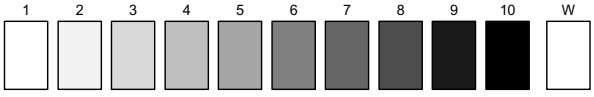
B. Note for copy density adjustment

1) Arrangement before execution of the copy density adjustment

- Clean the optical section.
- Clean or replace the charger wire.
- Check that the voltage at the high voltage section and the developing bias voltage are in the specified range.

C. Necessary tool for copy density adjustment

- One of the following test charts:
  UKOG-0162FCZZ, UKOG-0089CSZZ, KODAK GRAY SCALE
- B4 (14" x 8 1/2") white paper
- The user program AE setting should be "3."



Test chart comparison table

UKOG-0162FCZZ DENSITY No.	1	2	3	4	5	6	7	8	9	10	W
UKOG-0089CSZZ DENSITY No.	0.1		0.2		0.3				0.5	1.9	0
KODAK GRAY SCALE		1		2		3		4		19	A

D. Features of copy density adjustment

For the copy density adjustment, the image data shift function provided in the image process LSI is used.

List of the adjustment modes

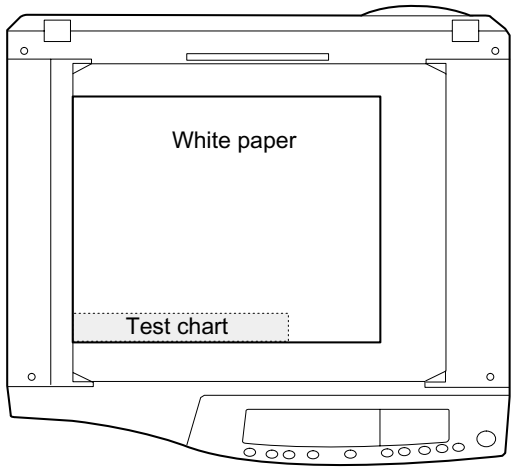
Auto Mode	Brightness 1 step only
Manual Mode	Brightness 5 steps. Adjustment of only the center brightness is made.
Photo Mode	Brightness 5 steps. Adjustment of only the center brightness is made.
Manual T/S mode	Brightness 5 steps. Adjustment of only the center brightness is made.
T/S Auto mode	Brightness 1 step only

E. Copy density adjustment procedure

Use SIM 46 - 01 to set the copy density for each copy mode.
For selection of modes, use the copy mode select key.

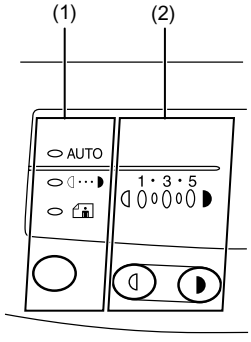
(1) Test chart (UKOG-0162FCZZ) setting

1) Place the test chart so that its edge is aligned with the A4 (Letter) reference line on the document table. Then place a B4 (14" x 8 1/2") white paper on the test chart and close the document cover.



(2) Perform the adjustment in each mode.

1) Execute SIM 46-1.
2) Select the mode to be adjusted with the exposure mode select key. Set the exposure level to 3 for all adjustment. (Except for the auto mode.)

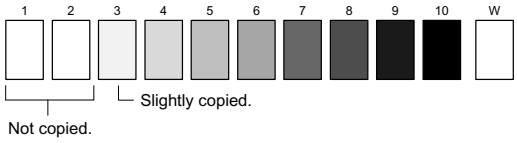
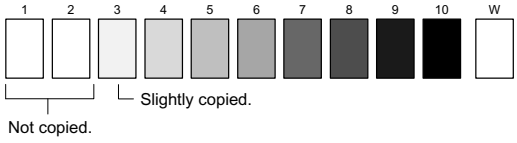


(1) Mode select key/display lamp

(2) Exposure level select key/display lamp

Adjustment mode	Exposure mode display lamp	Exposure level	Sharp gray chart adjustment level
Auto mode	Auto lamp ON	-	"3" is slightly copied.
Manual mode	Manual lamp ON	3	"3" is slightly copied.
Photo mode	Photo lamp ON	3	"3" is slightly copied.
Manual T/S mode	Manual lamp/Photo lamp ON	3	"4" is slightly copied.
Auto T/S mode	Auto lamp/Photo lamp ON	3	"4" is slightly copied.

3) Make a copy.
Check the adjustment level (shown in the above table) of the exposure test chart (Sharp Gray Scale).

	Sharp Gray Scale adjustment level
Non toner save mode	
Toner save mode	

(When too bright): Decrease the value displayed on the copy quantity display.
(When too dark): Increase the value displayed on the copy quantity display.

* The value can be set in the range of 1 - 99.

3. High voltage adjustment

A. Main charger (Grid bias)

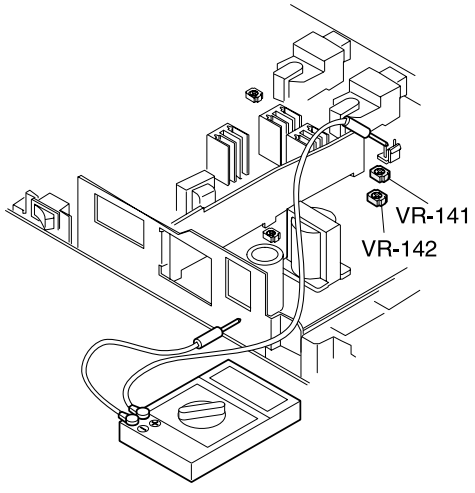
Note:

•Use a digital multi meter with internal resistance of 10MΩ or more measurement.

•After adjusting the grid LOW output, adjust the HIGH output. Do not reverse the sequence.

Procedures

1) Set the digital multi meter range to DC700V.
2) Set the positive side of the test rod to the connector CN11-3 (GRID) of high voltage section of the power PWB and set the negative side to the frame ground (radiating plate).
3) Execute SIM 8-3. (The main charger output is supplied for 30 sec in the grid voltage LOW output mode.)
4) Adjust the control volume (VR-141) so that the output voltage is -400 ±20V.
5) Execute SIM 8-2. (The main charger output is supplied for 30 sec in the grid voltage HIGH output mode.)
6) Adjust the control volume (VR-142) so that the output voltage is 580 ±10V.

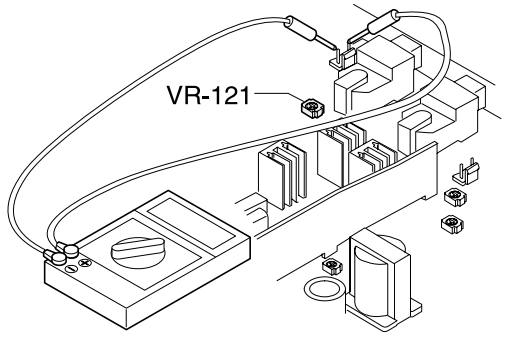


B. DV bias adjustment

Note: A digital multi meter with internal resistance of 1GΩ must be use for correct adjustment.

Procedures

1) Set the digital multi meter range to DC500V.
2) Set the positive side of the test rod to the connector CN-10-1 (DV BIAS) and set the negative side to the connector CN10-2 (FG).
3) Execute SIM 25-1. (The developing bias is outputted for 30 sec.)
4) Adjust the control volume (VR-121) so that the output voltage is -400 ±5V.



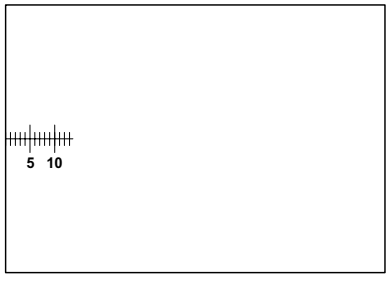
4. Duplex adjustment

A. Adjusting the paper reverse position in memory for duplex copying

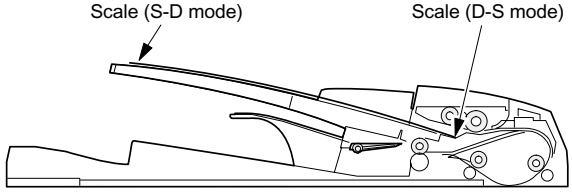
This step adjusts the front surface printing (odd-number pages of a document set) in the S-D mode copying and the leading edge position of an image on even-number pages in the D-S mode.
That is, it covers the adjustment of the second surface printing mode (image loss at the front edge of an image) in which image data is once stored in memory.
The image data is read, starting from its front end in the document delivery direction (Reference direction of document setting in the OC mode)and stored in memory.
This stored image data is printed starting at the printing start position, in the order of last-stored data to the first-stored data.
In other words, the front edge image loss of the image can be adjusted by changing the document read end position.

(Adjustment procedure)

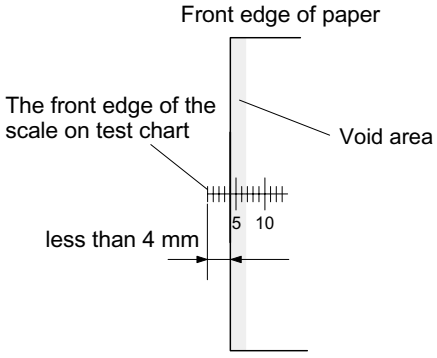
1) Preparing test chart (Draw a scale at the rear end of one side of a sheet of A4 white paper or letter paper)

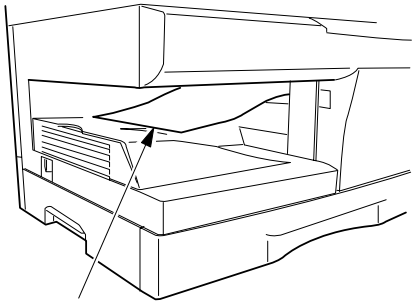


2) Set the test chart so that the scale is positioned as shown below, in the S-D mode and the D-S mode.



3) Execute simulation 50-18 to make a copy and check the front edge image loss at the area where the scale is printed.
Adjust the setting so that the front edge image loss is less than 4.0 mm in the R-SPF mode.
An increase of 1 in setting represents an increase of 0.1 mm in image loss.





2nd printing surface where scale is printed (lower side)

B. Adjusting trailing edge void in duplex copyin mode

This is the adjustment of the first surface printing mode (rear end void) in duplex copying.
In a duplex copying operation, the paper is delivered starting from the rear end of the first printing surface. It is therefore necessary to make a void area at the rear end on the first printing surface to prevent paper jam at the fusing part.
There are two adjustment modes:

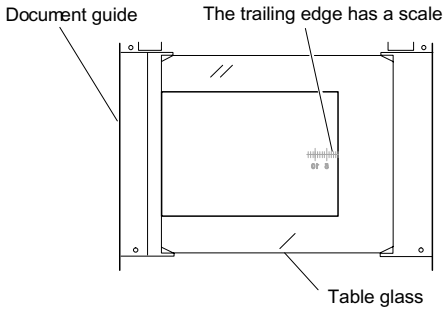
1) Image cut rear end void quantity (R-SPF) 50-19(AE)
The size (length) of a document read from the R-SPF is detected, the image at the trailing edge of the first printing surface is cut to make a void area. (The adjustment of void quantity at the time when the cassette paper size is not recognized.)
2) Paper trailing edge void quantity 50-19 (TEXT)
This adjustment is made when the cassette paper size is recognized. The trailing edge void quantity can be adjusted by changing the trailing edge image laser OFF timing.

The paper void quantity should be first adjusted before the image cut trailing edge void quantity (R-SPF) is adjusted.

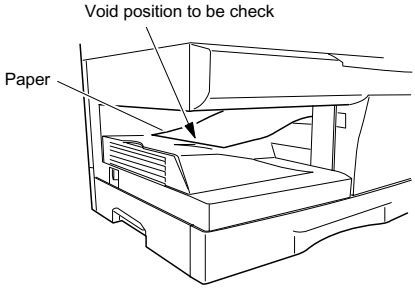
(Adjustment procedure)

(1) Paper trailing edge void quantity

1) Preparing test chart (Draw a scale at the rear end of one side of a sheet of A/4 white paper or letter paper)
2) Set the test chart on the document glass as shown below.



3) Using the user simulation [18], set the paper size of the first cassette.
• Letter paper: 4
• A4 paper: 3
4) Execute simulation 50-19 to turn on the TEXT lamp and make the printing mode in OC-D mode.
Make a copy of the test chart to check the void area of the scale on the image.

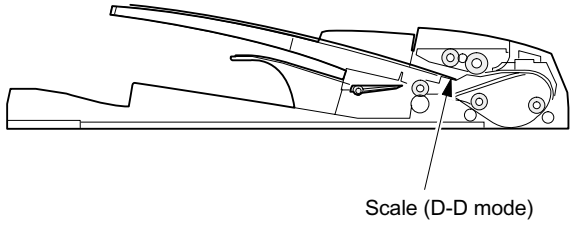


The trailing edge void on the first printing surface is shown above.

Adjust the setting so that the void area is 4 - 5 mm. An increase in 1 of setting represents 0.1 mm in void area.

(2) Image cut trailing edge void quantity (R-SPF)

1) Set the test chart so that the scale is positioned as shown below.



2) Execute simulation 50-19 to turn on the AE lamp(on the operation panel) and make the printing mode in the D-D mode.

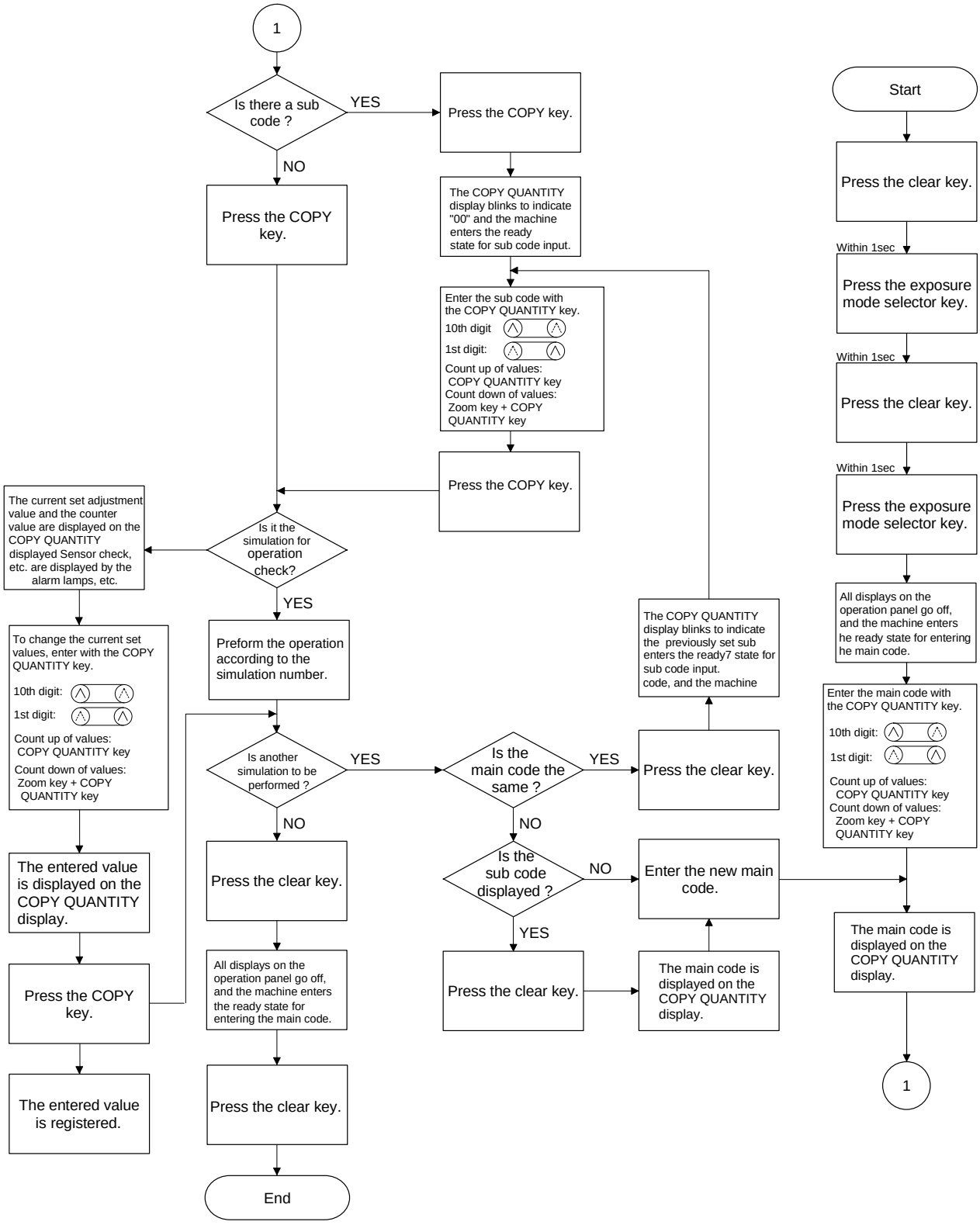
3) Remove and reinsert the cassette.
Note: Make sure to carry out this step before making a copy during this adjustment.

4) Make a copy and check the void area of the scale on the image.
Adjust the setting so that the void area is 2 - 4 mm. An increase of 1 in setting represents an increase of 0.1 mm in void area.
l Void position to be checked

[10]SIMULATION, TROUBLE CODES

1. Entering the simulation mode

To enter the serviceman simulation mode, press the keys as follows:
Clear → Density select → Clear→ Density select
To cancel the simulation mode, press the clear key.
Flow chart of entering the simulation mode


1
Is there a sub code ?
YES
Press the COPY key.
NO
Press the COPY key.
The COPY QUANTITY display blinks to indicate "00" and the machine enters the ready state for sub code input.
Enter the sub code with the COPY QUANTITY key.
10th digit
1st digit:
Count up of values: COPY QUANTITY key
Count down of values: Zoom key + COPY QUANTITY key
Press the COPY key.
Is it the simulation for operation check?
The current set adjustment value and the counter value are displayed on the COPY QUANTITY displayed Sensor check, etc. are displayed by the alarm lamps, etc.
YES
To change the current set values, enter with the COPY QUANTITY key.
10th digit:
1st digit:
Count up of values: COPY QUANTITY key
Count down of values: Zoom key + COPY QUANTITY key
Preform the operation according to the simulation number.
The entered value is displayed on the COPY QUANTITY display.
Press the COPY key.
The entered value is registered.
Is another simulation to be performed ?
YES
NO
Press the clear key.
All displays on the operation panel go off, and the machine enters the ready state for entering the main code.
Press the clear key.
End
Is the main code the same ?
YES
NO
Is the sub code displayed ?
NO
YES
Press the clear key.
The main code is displayed on the COPY QUANTITY display.
Enter the new main code.
The COPY QUANTITY display blinks to indicate the previously set sub enters the ready7 state for sub code input.
code, and the machine
Press the clear key.
Start
Press the clear key.
Within 1sec
Press the exposure mode selector key.
Within 1sec
Press the clear key.
Within 1sec
Press the exposure mode selector key.
All displays on the operation panel go off, and the machine enters he ready state for entering he main code.
Enter the main code with the COPY QUANTITY key.
10th digit:
1st digit:
Count up of values: COPY QUANTITY key
Count down of values: Zoom key + COPY QUANTITY key
The main code is displayed on the COPY QUANTITY display.
1

2. List of simulations

Sim No.	Kind of main code	Sub code	Operation
01	Optical system	01	Mirror scan operation
02	SPF Individual load operation	02	SPF sensor status display
		03	Motor ON
		04	Paper feed solenoid ON
		05	Pressure release solenoid ON (RSPF)
		06	Resist clutch ON (RSPF)
		07	Gate solenoid ON (RSPF)
05	Lamp ON check	01	Operation panel display check
		02	Fusing lamp ON + Cooling fan HIGH/LOW speed
		03	Copy lamp ON
06	Machine individual load operation	01	Paper feed solenoid ON
		02	Resist solenoid ON
07	Aging	01	Warm up display and aging with jam
		06	Intermittent aging
08	High voltage output check	01	Developing bias
		02	Main charger (Grid high)
		03	Grid voltage (Low)
		06	Transfer charger
10	Other	None	Toner motor aging
14	Trouble reset	None	Cancel troubles other than U2
16	U2 trouble reset	None	Cancel of U2 trouble
22	Counter display	05	Total counter display
		12	Drum counter display
		14	P-ROM version display
		21	Scanner counter display
24	Special counter clear	07	Drum counter clear
		13	Scanner counter clear
25	Main motor ON	01	Main motor system ON + Cooling fan low speed (For the duplex model, the duplex motor is simultaneously turned on.)
		10	Polygon motor ON
26	Various setup	01	Manual feed setup
		02	SPF setup
		03	Second cassette setup
		04	Machine duplex setup
		06	Destination setup
		07	Machine conditions check
		20	Rear edge void setup
		30	CE mark conformity control ON/OFF setup
		38	Cancel of stop at drum life over
		39	Memory capacity setup
		40	Polygon motor OFF time setup
		42	Transfer ON timing control setup
		43	Side void setup
		44	SPF document rear edge read setup
30	Sensor operation check (Standard provision)	01	Paper sensor status display
43	Fusing temperature setup	01	Normal copy
		04	Fusing temperature setup 2
		05	Duplex mode fusing temperature setup

Sim No.	Kind of main code	Sub code	Operation
46	Exposure adjustment	01	Copy density adjustment
48	Magnification ratio correction	01	Front/rear scan direction
50	Lead edge adjustment	01	Lead edge image position adjustment Paper lead edge/rear edge void adjustment
		10	Paper center offset + OC/Document center offset + SPF document center offset
		18	Memory reverse position adjustment
		19	Duplex copy rear edge void adjustment
51	Timing adjustment	02	Resist quantity adjustment
		06	SPF exposure correction
61	Laser system operation	03	Polygon motor check (HSYNC output check)
63	Shading	01	Shading check
64	Self print	01	Self print only with the engine (1 by 2 mode)

3. Contents of simulations (new or revised simulations only)

Input method: Clear key → Exposure Select key → Clear key → Exposure Select key

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>01</td><td>01</td><td>Mirror scan operation
(Operation/Procedure)
1. When this simulation is executed, the mirror home position is detected.
<table><tr><th>Sensor name</th><th>Display lamp</th></tr><tr><td>Mirror home position sensor</td><td>OPC drum cartridge replacement lamp</td></tr></table>
2. When the _START key is pressed, scanning is executed at the speed corresponding to the currently set copymagnification ratio. The copy magnification ratio can be arbitrarily set with the magnification ratio select key/zoom key.</td></tr>
<tr><td>02</td><td>02</td><td>SPF sensor status display
ON/OFF of the sensors in the SPF can be checked with the following lamps.
<table><tr><th>Display</th><th>Sensor</th></tr><tr><td>Developer cartridge replacement lamp</td><td>Document set detection (SPID)</td></tr><tr><td>Jam lamp</td><td>SPF document transport detection (SPPD)</td></tr><tr><td>Photoconductor cartridge replacement lamp</td><td>SPF cover open detection (SCOD)</td></tr><tr><td>SPF jam lamp</td><td>SPF open/close detection (SDSW)
FAX document size detection
Paper size detection</td></tr><tr><td>SPF lamp</td><td>FAX/SPF B4 size detection (SB4D)</td></tr></table></td></tr>
<tr><td></td><td>03</td><td>Motor ON
(Operation/Procedure)
When the start key is pressed, the SPF motor rotates for 10 sec at the speed corresponding to the currently set magnification ratio.</td></tr>
<tr><td></td><td>04</td><td>Paper feed solenoid ON
(Operation/Procedure)
When the start key is pressed, the SPF paper feed solenoid repeats ON (500 ms) and OFF (500 ms) 20 times.</td></tr>
<tr><td></td><td>05</td><td>Pressure release solenoid ON (RSPF)
(Operation/Procedure)
When the start key is pressed, the RSPF document transport solenoid (SPFS) repeats ON (500 ms) and OFF (500 ms) 20 times.</td></tr>
<tr><td></td><td>06</td><td>Resist clutch ON (RSPF)
(Operation/Procedure)
When the start key is pressed, the RSPF resist clutch (SRRC) repeats ON (500 ms) and OFF (500 ms) 20 times.</td></tr>
<tr><td></td><td>07</td><td>Gate solenoid ON (RSPF)
(Operation/Procedure)
When the start key is pressed, the RSPF gate solenoid (SGS) repeats ON (500 ms) and OFF (500 ms) 20 times.</td></tr>
<tr><td>05</td><td>01</td><td>Operation panel display check
When the PRINT switch is pressed, the LED on the operation panel is lighted for 5 sec. The LED on the FAX panel and the LCD black background are displayed simultaneously.</td></tr>
<tr><td></td><td>02</td><td>Fusing lamp ON + cooling fan HIGH/LOW speed
(Operation/Procedure)
When the START key is pressed, the fusing lamp repeats ON (500ms) and OFF (500msec) 5 times.
During this period, the cooling fan rotates in the high speed mode. After completion of the operation, the cooling fan rotates in the low speed mode.</td></tr>
<tr><td></td><td>03</td><td>Copy lamp ON
(Operation/Procedure)
When the START key is pressed, the copy lamp is lighted for 5 sec.</td></tr>
<tr><td>06</td><td>01</td><td>Paper feed solenoid ON
(Operation/Procedure)
When the START key is pressed, the paper feed solenoid selected by the tray select key repeats ON (500ms) and OFF (500ms) 20 times.</td></tr>
<tr><td></td><td>02</td><td>Resist solenoid ON
(Operation/Procedure)
When the START key is pressed, the resist solenoid (RRS) repeats ON (500ms) and OFF (500ms) 20 times.</td></tr>
</table>

Main code	Sub code	Content
07	01	Warm-up display and aging with jam (Operation/Procedure) 1. When the simulation is executed, warming up is started. 2. Warm-up time is counted and displayed every second on the copy quantity display. 3. After completion of warm-up, the time count is stopped and the ready lamp is lighted. 4. Press the clear key to clear the warm-up time display, set the copy quantity, and press the START key, and the machine will copy the set quantity repeatedly.
	06	Intermittent aging (Operation/Procedure) 1. When the simulation is executed, warming up is started. 2. After completion of warm-up, the ready lamp is lighted. 3. Set the copy quantity and press the START key, and the machine will copy the set quantity repeatedly. 4. After 3 sec of the interval time from completion of copying the set quantity, the machine will resume copying. 5. The above operation 4 is repeated.
08	01	Developing bias (Operation/Procedure) When the START key is pressed, the developing bias is outputted for 30 sec.
	02	Main charger (Grid high) (Operation/Procedure) When the START key is pressed, the main charger output is supplied for 30 sec in the grid voltage HIGH mode.
	03	Grid voltage (Low) (Operation/Procedure) When the START key is pressed, the main charger output is supplied for 30 sec in the grid voltage LOW mode.
	06	Transfer charger (Operation/Procedure) When the START key is pressed, the transfer charger output is supplied for 30 sec.
10	None	Toner motor aging (Operation/Procedure) When the START key is pressed, the toner motor output is supplied for 30 sec.
14	None	Cancel of troubles other than U2 (Operation/Procedure) After canceling the trouble, the simulation is also automatically canceled.
16	None	Cancel of U2 trouble (Operation/Procedure) 1. When the START key is pressed, the EEPROM total counter check sum is rewritten and the trouble is canceled. 2. After canceling the trouble, the simulation is also automatically canceled.
22	05	Total counter display The total count value is dispalyed in 3 digits X 2 times repeatedly. <Display example: 12345> 012 → Blank → 345 → Blank → 012 0.7s 0.3s 0.7s 1.0s 0.7s
	12	Drum counter display The display method is the same as the total count value display.
	14	P-ROM version display The P-ROM version is displayed in 3 digits on the value display section. (AR, DM, PCL models: 100% Zoom lamp display)
	21	Scanner counter display The display method is the same as the total count value display.
24	07	Drum counter clear When the PRINT switch is pressed, the drum count value is reset to 0.
	13	Scanner counter clear When the PRINT switch is pressed, the scanner count value is reset to 0.
25	01	Main motor system ON + Cooling fan low speed (For the duplex model, the duplex motor is simultaneously turned on.) (Operation/Procedure) When the START key is pressed, the main motor is rotated for 30 sec. To save toner consumption, the different operations are executed depending on installation of the developing unit. •When the developing unit is installed, the developing bias, the main charger, and the grid are also outputted. •When the developing unit is not installed, only the motor is rotated. *Do not turn on the door open/close switch forcibly to execute this simulation.
	10	Polygon motor ON (Operation/Procedure) When the START key is pressed, the polygon motor is operated for 30 sec.

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>26</td><td>01</td><td>Manual feed setup
(Operation/Procedure)
1. When this simulation is executed, the currently set bypass code number is displayed.
2. Enter the code number corresponding to the bypass and press the START key, and the setting will be changed.

<table>
<tr><th>Code number</th><th>Bypass</th></tr>
<tr><td>0</td><td>Single bypass</td></tr>
<tr><td>1</td><td>Multi bypass</td></tr>
</table>
</td></tr>
<tr><td></td><td>02</td><td>SPF setup
When this simulation is executed, the currently set SPF code number is displayed. Enter the code number of the SPF to be set and press the PRINT switch. The setup is changed.

<table>
<tr><th>Code number</th><th>SPF</th></tr>
<tr><td>0</td><td>Without SPF</td></tr>
<tr><td>1</td><td>With SPF (Setup is required when installing FAX.)</td></tr>
<tr><td>2</td><td>With RSPF</td></tr>
</table>
</td></tr>
<tr><td></td><td>03</td><td>Second cassette setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number of the second cassette is displayed.
2. Enter the code number and press the start key. The setting is changed.

<table>
<tr><th>Code number</th><th>Second cassette</th></tr>
<tr><td>0</td><td>Without second cassette</td></tr>
<tr><td>1</td><td>With second cassette</td></tr>
</table>
</td></tr>
<tr><td></td><td>04</td><td>Machine duplex setup
(Operation/Procedure)
1. When this simulation is executed, the currently set duplex code number is displayed.
2. Enter the code number corresponding to the duplex and press the ENTER key, and the setup will be changed.

<table>
<tr><th>Code number</th><th>Duplex</th></tr>
<tr><td>0</td><td>Without Duplex</td></tr>
<tr><td>1</td><td>With Duplex</td></tr>
</table>
</td></tr>
<tr><td></td><td>06</td><td>Destination setup
(Operation/Procedure)
1. When this simulation is executed, the currently set destination code number is displayed.
2. Enter the code number corresponding to the destination and press the START key, and the setting will be changed.

<table>
<tr><th>Code number</th><th>Destination</th></tr>
<tr><td>0</td><td>Inch series</td></tr>
<tr><td>1</td><td>EX AB series</td></tr>
<tr><td>2</td><td>Japan AB series</td></tr>
</table>
</td></tr>
<tr><td></td><td>07</td><td>Machine conditions check
(Operation/Procedure)
When this simulation is executed, the current machine setting is displayed.

<table>
<tr><th>CPM</th><th>Copy quantity display</th></tr>
<tr><td>10 cpm</td><td>10</td></tr>
<tr><td>12 cpm</td><td>12</td></tr>
<tr><td>15 cpm</td><td>15</td></tr>
</table>
The machine type is shown with the lamp display.
AL series: None
AR-A series: AE mode lamp ON
AR-B series: TEXT mode lamp ON
DM series: Photo mode lamp ON</td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>26</td><td>20</td><td>Rear edge void setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number of rear edge void setting is displayed.
2. Enter the code number of rear edge void setting and press the START key, and the setting will be changed.

<table>
<tr><th>Code number</th><th>Rear edge void setting</th></tr>
<tr><td>0</td><td>Rear edge void allowed</td></tr>
<tr><td>1</td><td>Rear edge void not allowed</td></tr>
</table>
</td></tr>
<tr><td></td><td>30</td><td>CE mark conformity control ON/OFF setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number of CE mark application is displayed.
2. Enter the code number of CE mark application and press the START key, and the setting will be changed.

<table>
<tr><th>Code number</th><th>CE mark application setting</th></tr>
<tr><td>0</td><td>CE mark application control OFF</td></tr>
<tr><td>1</td><td>CE mark application control ON</td></tr>
</table>
</td></tr>
<tr><td></td><td>38</td><td>Cancel of stop at drum life over
(Operation/Procedure)
1. When this simulation is executed, the currently set code number is displayed.
2. Enter the code number and press the START key, and the setting will be changed.

<table>
<tr><th>Code number</th><th>Setting</th></tr>
<tr><td>0</td><td>Stop at drum life over</td></tr>
<tr><td>1</td><td>Stop cancel at drum life over</td></tr>
</table>
</td></tr>
<tr><td></td><td>39</td><td>Memory capacity setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number is displayed.
2. Enter the code number and press the START key, and the setting will be changed.

<table>
<tr><th>Code number</th><th>Setting</th></tr>
<tr><td>0</td><td>No memory</td></tr>
<tr><td>1</td><td>4 Mbyte</td></tr>
<tr><td>2</td><td>6 Mbyte</td></tr>
</table>
</td></tr>
<tr><td></td><td>40</td><td>Polygon motor OFF time setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number is displayed.
2. Enter the code number and press the START key, and the setting will be changed.

<table>
<tr><th>Code number</th><th>Setting</th></tr>
<tr><td>0</td><td>0 sec</td></tr>
<tr><td>1</td><td>30 sec</td></tr>
<tr><td>2</td><td>60 sec</td></tr>
<tr><td>3</td><td>90 sec</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>26</td><td>42</td><td>Transfer ON timing control setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number is displayed.
2. Enter the code number and press the START key, and the setting will be changed. (For any number different from the following ones, the default time is automatically set.)

<table>
<tr><th>Code number</th><th>Setting</th></tr>
<tr><td>0</td><td>Default (330 msec)</td></tr>
<tr><td>1</td><td>-40 msec</td></tr>
<tr><td>2</td><td>-30 msec</td></tr>
<tr><td>3</td><td>-20 msec</td></tr>
<tr><td>4</td><td>-10 msec</td></tr>
<tr><td>5</td><td>Default (330 msec)</td></tr>
<tr><td>6</td><td>+10 msec</td></tr>
<tr><td>7</td><td>+20 msec</td></tr>
<tr><td>8</td><td>+30 msec</td></tr>
<tr><td>9</td><td>+40 msec</td></tr>
</table></td></tr>
<tr><td></td><td>43</td><td>Side void setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number of the side void amount is displayed.
2. Enter the code number and press the start key. The setting is changed.

<table>
<tr><th>Code number</th><th>Setting</th></tr>
<tr><td>0</td><td>0 mm</td></tr>
<tr><td>1</td><td>0.5 mm</td></tr>
<tr><td>2</td><td>1.0 mm</td></tr>
<tr><td>3</td><td>1.5 mm</td></tr>
<tr><td>4</td><td>2.0 mm *Default</td></tr>
<tr><td>5</td><td>2.5 mm</td></tr>
<tr><td>6</td><td>3.0 mm</td></tr>
<tr><td>7</td><td>3.5 mm</td></tr>
<tr><td>8</td><td>4.0 mm</td></tr>
<tr><td>9</td><td>4.5 mm</td></tr>
<tr><td>10</td><td>5.0 mm</td></tr>
</table></td></tr>
<tr><td></td><td>44</td><td>SPF document rear edge read setup + Fax document rear edge scan setup.

When this simulation is executed, the currently set code number is displayed. Enter the desired code number and press the START key, and the display will be changed. The document rear edge scanning area in SPF reduction (less than 100%) copy is changed.

The code number is changeable in the range of 0 - 8.
The default value is 4, and 2 mm of the document rear edge is cut.
When the value is changed by 1, the area is changed by 1 mm.</td></tr>
<tr><td>30</td><td>01</td><td>Paper sensor status display
The paper sensor status is displayed with the lamps on the operation panel.

<table>
<tr><th>Display</th><th>Sensor</th></tr>
<tr><td>Developer cartridge replacement lamp</td><td>Paper detection before resist (PPD1)</td></tr>
<tr><td>JAM lamp</td><td>Fusing section paper detection (PPD2)</td></tr>
<tr><td>Photoconductor cartridge replacement lamp</td><td>Paper exit paper detection (POD)</td></tr>
<tr><td>2nd cassette lamp</td><td>2nd CS paper detection (PPD3)</td></tr>
<tr><td>Zoom lamp</td><td>New drum cartridge detection (PUIS)</td></tr>
<tr><td>AE lamp</td><td>Single manual feed paper detection (MFD)</td></tr>
<tr><td>Exposure level 1 (Light) lamp</td><td>Main cassette A4 width detection (PSW1)</td></tr>
<tr><td>Exposure level 5 (Dark) lamp</td><td>2nd cassette A4 width detection (PSW2)</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>43</td><td>01</td><td>Fusing temperature setup (Normal copy)
(Operation/Procedure)
1. When this simulation is executed, the currently set code number is displayed.
2. Enter the code number and press the START key, and the setting will be changed.

<table><tr><th>Code number</th><th>Set temperature (°C)</th></tr><tr><td>0</td><td>175</td></tr><tr><td>1</td><td>180</td></tr><tr><td>2</td><td>185</td></tr><tr><td>3</td><td>190</td></tr><tr><td>4</td><td>195 (* Default)</td></tr><tr><td>5</td><td>200</td></tr></table></td></tr>
<tr><td></td><td>04</td><td>Fusing temperature setup 2
(Operation/Procedure)
1. When this simulation is executed, the currently set code number is displayed.
2. Enter the code number and press the START key, and the setting will be changed.

<table><tr><th>Code number</th><th>Set temperature (°C)</th></tr><tr><td>0</td><td>155</td></tr><tr><td>1</td><td>160</td></tr><tr><td>2</td><td>165</td></tr><tr><td>3</td><td>170 (* Default)</td></tr><tr><td>4</td><td>175</td></tr><tr><td>5</td><td>180</td></tr></table></td></tr>
<tr><td></td><td>05</td><td>Duplex mode fusing temperature setup
(Operation/Procedure)
1. When this simulation is executed, the currently set code number is displayed.
2. Enter the code number corresponding to the duplex and press the START key. The setting is changed accordingly.

<table><tr><th>Code number</th><th>Shift temperature (°C)</th></tr><tr><td>0</td><td>±0°C</td></tr><tr><td>1</td><td>-8°C</td></tr><tr><td>2</td><td>-6°C</td></tr><tr><td>3</td><td>-4°C</td></tr><tr><td>4</td><td>-2°C</td></tr><tr><td>5</td><td>±0°C</td></tr><tr><td>6</td><td>+2°C</td></tr><tr><td>7</td><td>+4°C</td></tr><tr><td>8</td><td>+6°C</td></tr><tr><td>9</td><td>+8°C</td></tr></table>
*The above shift temperature set by this simulation is added to the fusing temperature of single copy.</td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>46</td><td>01</td><td>
Copy density adjustment
(Outline)
Used to adjust the copy density in each copy mode. (The copy density can be set by changing the set value of ASIC GAMMA ADJUST register.)
Setting in each copy mode is performed at exposure level 3. When the copy density (exposure) is adjusted arbitrarily, the max, and min. exposure levels are automatically calculated and set. (The change amounts (gradient, change amount) at level 1 - 5 are predetermined.)
(Operation/Procedure)
1. When this simulation is executed, warming up and shading are performed and the current set value is displayed in two digits.
2. Press the copy mode select key to select each setting mode and setting display.
*The copy mode setting is indicated with the following lamps as shown below.
3. Change the setting with the value up-down key and press the START key, and a copy will be made with the entered set value.
4. Press the clear key to store the set value and exit the simulation.

<table>
<tr><th>Copy mode</th><th>Display lamp</th></tr>
<tr><td>AE mode</td><td>AE mode lamp</td></tr>
<tr><td>TEXT mode T</td><td>EXT mode lamp</td></tr>
<tr><td>PHOTO mode</td><td>PHOTO mode lamp</td></tr>
<tr><td>TS mode (TEXT)</td><td>TEXT mode lamp & PHOTO mode lamp</td></tr>
<tr><td>TS mode (AE)</td><td>AE mode lamp & PHOTO mode lamp</td></tr>
</table>
Relationship between the displayed values and the GAMMA ADJUST register

<table>
<tr><th></th><th>Exp1</th><th>Exp2</th><th>Exp3</th><th>Exp4</th><th>Exp5</th></tr>
<tr><td>AE</td><td>-24</td><td>-12</td><td>0</td><td>+12</td><td>+24</td></tr>
<tr><td>TEXT</td><td>-24</td><td>-12</td><td>0</td><td>+12</td><td>+24</td></tr>
<tr><td>PHOTO</td><td>-24</td><td>-12</td><td>0</td><td>+12</td><td>+24</td></tr>
<tr><td>T/S</td><td>-24</td><td>-12</td><td>0</td><td>+12</td><td>+24</td></tr>
</table>
The value displayed after execution of this simulation can be set in the range of 0 - 99 with 50 as the center value.
When the text mode set value is Gat3, for example, the GAMMA ADJUST register value set at Exp1 is:
Text Exp1 = Gat3 - 50 - 24
When 40 is set to Gat3, Text Exp1 = 40 - 50 - 24 = -34.
Then set the GAMMA ADJUST register set value to -34.
Perform the same procedure for each mode and each Exp.
*The above table may subject to change.
*For the gradient, there is a similar table, though not specified here. The value set with SIM 46, however, is not reflected.
*The AE mode Exp selection is not specified, but corresponds to the grades for AE exposure selection in the former models.
</td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>48</td><td>01</td><td>
Front/rear scan direction
(Outline)
(1) Front/rear scanning direction magnification ratio auto correction: (Performed by changing the set value of ZOOM DATA register for ASIC.) The width of the reference line marked on the shading correction plate is scanned to perform the front/rear direction magnification ratio adjustment automatically. (Performed by changing the set value of ZOOM DATA register for ASIC.)
(2) Front/rear scanning direction magnification ratio manual correction: Used to set the front/rear (main scanning) direction magnification ratio by key operations. (Performed by changing the set value of ZOOM DATA register for ASIC.)
(3) Scanning direction magnification ratio correction: The scanning direction magnification ratio in the OC mode is set by key operations. (Performed by changing the scanning speed.)
(4) SPF mode scanning direction magnification ratio correction: The scanning direction magnification ratio in the OC mode is set by key operations. (Performed by changing the scanning speed.)
(Operation/Procedure)
1. When this simulation is executed, the current set value is displayed in two digits. (Center value: 50)
2. When the copy mode select key is pressed, the setting mode and the setting display are changed sequentially.
*The selected adjustment mode is indicated by the lamps as follows:
3. In the front/rear scanning direction adjustment, when the START key is pressed, the mirror base unit moves to the white plate for shading and the width of the reference line is read and the correction value is calculated and displayed and the value is stored.
In the case of the manual adjustment, enter the adjustment value with the 10-key and press the START key.
Then the entered value is stored and a copy is made. (An increase of 1 in the set value corresponds to an increase of 1&.)
4. Press the clear key to store the set value and exit the simulation.

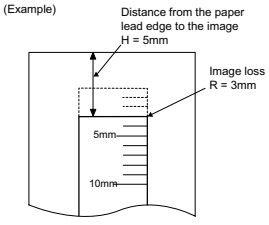
<table>
<tr><th>Adjustment mode</th><th>Lamps ON</th></tr>
<tr><td>Front/rear direction magnification ratio auto correction</td><td>AE lamp</td></tr>
<tr><td>Front/rear direction magnification ratio manual correction</td><td>TEXT lamp</td></tr>
<tr><td>Scanning direction magnification ratio correction</td><td>PHOTO lamp</td></tr>
<tr><td>SPF mode scanning direction magnification ratio correction</td><td>AE, TEXT, PHOTO lamps</td></tr>
</table>

In the front-rear direction magnification ratio correction:
(1) The result of calculation of the scan correction value is ±5% or less, "- -" is displayed.
(Cause) The white plate reference position error or the lens unit installing error
(2) In case of a scanning error of the reference line, the JAM lamp is turned on.
(Cause) CCD error or no white plate
* If the automatic correction of magnification ratio does not work properly, adjust and correct manually.
</td></tr>
</table>

Main code	Sub code	Content
50	01	Lead edge image position adjustment + Paper lead edge/rear edge void adjustment (Outline) This adjustment is used to adjust the copy image position and lead edge/rear edge void amount on the copy paper by adjusting the image scan start position and the print start position (resist roller ON timing) at 100%. (Operation/Procedure) 1. When this simulation is executed, the currently set value is displayed in two digits. (Center value: 50) 2. When the copy mode select key is pressed, each setting mode and the display are changed. *The selected adjustment mode is indicated by the lamps as shown in the table below. 3. Enter the adjustment value with the 10-key and press the start key. The set value is stored and a copy is made. (When the set value is increased by 1, the void amount is shifted by 0.1 mm.) 4. When the clear key is pressed, the set value is stored and the simulation mode is terminated.

Adjustment mode	Lighting lamps
Print start position (Main cassette)	AE, Main cassette lamps
Print start position (2nd cassette)	AE, 2nd lamps
Print start position (Manual paper feed)	AE, Manual feed lamps
Image lead edge void quantity	TEXT lamp
Image scan start position	PHOTO lamp
Image rear edge void quantity	AE, TEXT, PHOTO lamps
SPF image scan start position	AE, TEXT lamps

(Adjustment method)
1. Set the print start position (A: AE ON), the lead edge void amount (B: TEXT ON), the scanning start position (C: PHOTO ON) to zero and make a copy of a scale at 100%.
2. Measure the image loss R (mm) of the scale.
Set as C = 10 X R (mm). (Example: Set to 30.)
*When C is increased by 10, the image loss is decreased by 1 mm. (Default: 5)



3. Measure the distance H (mm) from the paper lead edge to the image print start position.
Set as A = 10 X R (mm). (Example: Set to 50.)
*When the value of A is increased by 10, the image lead edge is shifted toward the paper lead edge by 1 mm. (Default: 50)
4. Set the lead edge void amount as B = 50 (2.5 mm). (Default: 50)
*When the value of B is increased by 10, the void is increased by about 1 mm.
(For 25 or less, however, the void amount becomes zero.)
☆ The SPF adjustment is made by adjusting the SPF image scan start position immediately after turning on the power.

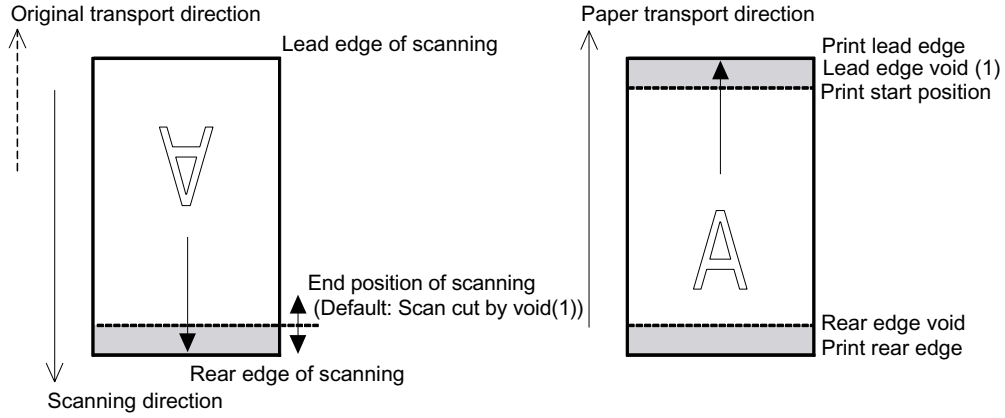
	10	Paper center offset + OC/Document center offset + SPF document center offset (Outline) The center offset position of copy image on the copy paper and that of document scan are adjusted by adjusting the scan left margin of ASIC and the print left margin register set value. (Operation/Procedure) 1. When this simulation is executed, the currently set value is displayed. 2. For a machine with a multi manual paper feed unit installed, when the copy mode select key is pressed, each set mode and display are changed. For a machine with a single manual paper feed unit installed, when the copy mode select key is pressed, each set mode and display are changed.

☆ Machine with a multi manual paper feed unit

Adjustment mode	Display lamp
Print center offset (Main cassette paper feed)	AE, main cassette lamp
Print center offset (2nd cassette paper feed)	AE, 2nd cassette lamp
Print center offset (Manual paper feed)	AE, Manual paper feed lamp
OC/Document center offset	AE, TEXT lamp
SPF/Document center offset	AE, TEXT, PHOTO lamp

☆ Machine with a single manual paper feed unit

Adjustment mode	Display lamp
Print center offset (Main cassette paper feed)	AE, Main cassette lamp
Print center offset (Manual paper feed)	AE lamp (Blinking)
OC/Document center offset	AE, TEXT lamp
SPF/Document center offset	AE, TEXT, PHOTO lamp

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>50</td><td>18</td><td>Memory reverse position adjustment in duplex copy
When this simulation is executed, the currently set correction value is displayed. Enter the desired correction value with the 10-key and press the print key. The entered value is stored. (The correction value ranges from 1 to 99. 0 or 50 for zero correction.)
Front print in the S-D mode and even page print in the D-S mode are performed with reverse memory operation from the rear of the original. When, therefore, the print position adjustment of the output image is required, perform the adjustment as follows:
The image direction in reverse memory copy is shown in Fig. 1. When the original scanning is made in the arrow direction, output images are printed from the rear edge of scanning.
If, therefore, the print lead edge is shifted, set the reference chart so that the reference position is in the rear and use this simulation to change the simulation set value so that the lead edge of print images comes in the proper position.
Printing is started at the print start position and executed from the final memory image data to the head data.
By changing the position of the end data stored in memory with the simulation set value, the image lead edge position is adjusted and the read edge position of scanning is changed.
Therefore, the end position of scanning is changed by the simulation set value to change the position of the end data stored in memory.
The image lead edge is adjusted in this manner.
 
</td></tr>
<tr><td></td><td>19</td><td>Duplex copy rear edge void adjustment
Used to adjust the rear edge void in duplex copy.
(Operating procedure)
When this simulation is executed, the currently set value is displayed in 2 digits.
When the copy mode select key is pressed, the set mode and the display are switched sequentially.
Enter the adjustment value with the 10-key and press the print key, and the entered value is stored and a copy is made. When the clear key is pressed, the entered value is stored and the simulation mode is terminated.
(When the set value is increased by 1, the void is increased by about 0.1mm.)
<table><tr><th>Adjustment mode</th><th>Lamp ON</th></tr><tr><td>Image cut rear edge void (RSPF)</td><td>AE lamp</td></tr><tr><td>Paper rear edge void</td><td>TEXT lamp</td></tr></table></td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Content</th></tr>
<tr><td>51</td><td>02</td><td>Resist quantity adjustment
Used to adjust the contact pressure of paper onto the copier resist roller and the RSPF resist roller.
(Operation/Procedure)
1. When this simulation is executed, the currently set value is displayed.
2. In a machine with the multi paper feed unit installed, press the copy mode select key, and each setting mode and display are changed sequentially.
In a machine with the single paper feed unit installed, press the copy mode select key, and each setting mode and display are changed sequentially.
*The selected adjustment mode is indicated by the lamps as listed below:
3. Enter the adjustment value with the 10-key and press the SORT key. Then the set value is stored and a copy is made.
4. Press the clear key to store the set value and exit the simulation.

*Machine with the multi manual paper feed
<table><tr><th>Adjustment mode</th><th>Display lamp</th></tr><tr><td>Main cassette paper feed</td><td>AE, Main cassette lamp</td></tr><tr><td>2nd cassette paper feed</td><td>AE, 2nd cassette lamp</td></tr><tr><td>Manual paper feed</td><td>AE, Manual paper feed lamp</td></tr><tr><td>RSPF document feed (front)</td><td>AE, TEXT, PHOTO lamp</td></tr><tr><td>RSPF document feed (back)</td><td>AE, TEXT lamp</td></tr><tr><td>Duplex back</td><td>TEXT, PHOTO lamp</td></tr></table>
*Machine with the single manual paper feed
<table><tr><th>Adjustment mode</th><th>Display lamp</th></tr><tr><td>Main cassette paper feed</td><td>AE, Main cassette lamp</td></tr><tr><td>Manual paper feed</td><td>AE blinking (Main cassette lamp ON)</td></tr><tr><td>RSPF document feed (front)</td><td>AE, TEXT, PHOTO lamp</td></tr><tr><td>RSPF document feed (back)</td><td>AE, TEXT lamp</td></tr><tr><td>Duplex back</td><td>TEXT, PHOTO lamp</td></tr></table></td></tr>
<tr><td></td><td>06</td><td>SPF exposure correction
(Outline)
The SPF exposure correction amount is adjusted by adjusting the change in Vref voltage for the OC mode.
(Operation/Procedure)
1. When this simulation is executed, the currently set value is displayed.
2. Enter the adjustment value with the 10-key and press the start key. The entered value is stored and a copy is made.
Note:When the adjustment value is changed by 1, the D/A output is changed by +1 digit (dark) for OC exposure.
When it is changed by -1, the output is changed by -1 digit (light).
3. When the clear key is pressed, the entered value is stored and the simulation mode is terminated.</td></tr>
<tr><td>61</td><td>03</td><td>Polygon motor check (HSYNC output check)
(Operation/Procedure)
When the START key is pressed, HSYNC is performed and the polygon motor is rotated for 30 sec.
At that time, the Zoom lamp is lit for 100msec for every 3 times that the HSYNC is detected.</td></tr>
<tr><td>63</td><td>01</td><td>Shading check
(Outline)
Used to display the detection level of the white plate for shading. (Vref of AD conversion IC is fixed.)
(Operation/Procedure)
When the START key is pressed, the mirror base unit moves to the white plate for shading and Vref+ voltage of AD conversion IC is set to 4.5V and Vref- voltage to 0.5V, and the copy lamp is lit.
This state is kept for 10 sec, and the level of one pixel at the center is detected every second to display on the value display section.</td></tr>
<tr><td>64</td><td>01</td><td>Self print only with the engine (1 by 2 mode)
(Outline)
Used to print in the 1 by 2 mode by ignoring the state of the optical system.
(Operation/Procedure)
1. When this simulation is executed, warming up is performed and the ready lamp is lit.
2. Select with the cassette select key and press the start key. Paper is fed from the selected cassette and printing is performed.
In the 1 by 2 mode, one line is printed and two lines are not printed.</td></tr>
</table>

4. Trouble codes

A. Trouble codes list

Main code	Sub code	Trouble content	Detail of trouble
E7	01	Duplex model memory setup error, memory not-detected error	The memory is not set properly or the memory capacity is not set to the duplex setup (6M). Cancel method: Set SIM 26-39 code number to 2.
	03	HSYNC not detected.	LSU (laser diode, reception element, APC circuit) trouble LSU drive circuit (ASIC) trouble
	04	CCD white level trouble	CCD drive circuit (CCD PWB, ASIC harness) trouble Copy lamp lighting trouble (Copy lamp, invertor PWB)
	05	CCD black level trouble	CCD drive circuit (CCD PWB, ASIC, harness) trouble
	12	Shading trouble (White correction)	Dirt on white plate for scanning white level
	14	ASIC connection trouble	Improper connection between CPU and ASIC (pattern cut, improper connection of lead pin)
	15	Copy lamp disconnection trouble	Copy lamp or copy lamp drive circuit (invertor PWB) trouble Copy lamp disconnection
	16	Laser output trouble	LSU (laser diode, reception element, APC circuit) trouble LSU drive circuit (ASIC) trouble
L1	00	Feeding is not completed within the specified time after starting feeding.	When the mirror base is returned for the specified time (6 sec) in mirror initializing after turning on the power, the mirror home position sensor (MHPS) does not turn OFF. Or when the mirror base is fed for the specified time (about 6 sec) after start of copy return, the mirror home position sensor (MHPS) does not turn OFF.
L3	00	Return is not completed within the specified time.	When the mirror base is returned for the specified time (6 sec) in mirror initializing after turning on the power, the mirror home position sensor (MHPS) does not turn ON. Or when the mirror base is returned for the specified time (about 6 sec) after start of copy return, the mirror home position sensor (MHPS) does not turn ON.
L4	01	Main motor lock	When the main motor encoder pulse is not detected for 100 msec.
L6	10	Polygon motor lock	The lock signal (specified rpm signal) does not return within a certain time (about 20 sec) from starting the polygon motor rotation
H2	00	Thermistor open detection	The fusing thermistor is open.
H3	00	Heat roller abnormally high temperature	The fusing temperature rises above 240°C.
H4	00	Heat roller abnormally low temperature	The fusing temperature does not reach 185°C within 27 sec of turning on the power, or the fusing temperature keeps at 140°C.
U2	01	Counter sum check error	When the counter check sum value stored in the EEPROM is abnormal.
	04	EEPROM serial communication error	When a communication trouble occurs with the EEPROM.

[11]USER PROGRAM

The conditions of factory setting can be changed according to the use conditions.

1. Functions which can be set with the user program

Function	Contents	Factory setting
Auto clear	•When a certain time is passed after completion of copying, this function returns to the initial state automatically. The time to reach the initial state can be set in the range of 30 sec to 120 sec by the unit of 30 sec. This function can be disabled.	60 sec
Pre-heat	•When the copier is left unused with the power ON, the power consumption is automatically reduced to about 40Wh/H (* Note).The time to start this function can be set in the range of 30 sec to 90 sec by the unit of 30 sec. This function cannot be disabled. •When this function is operated, the pre-heat lamp on the operation panel lights up.To return to the initial state, press any key on the operation panel. (When the COPY button is pressed, a copy is made after returning to the initial state.)	90 sec
Auto shut off passing time	•When the copier is left unused with the power ON, the power consumption is automatically reduced to about 18Wh/H (* Note). The time to start this function can be set in the range of 2 min to 120 min. • When this function is operated, all the lamps except for the pre-heat lamp on the operation panel turn off. To return to the initial state, press the COPY button.	5 min
Stream feeding	Only models with SPF	Set
Auto shut off setting	•Used to set or cancel this function.	Set

*Note:The power consumption values in pre-heat and auto shut off may be varied depending on the use conditions.

2. Change the setting.

Example: Changing the time to operate the auto shut off function (Change from 60 sec to 90 sec)

1) Press the right and the left exposure adjustment keys simultaneously to start setting.

• Keep pressing the keys for five sec.

• Display lamps (, , blink simultaneously and " -- " is displayed on the copy quantity display.

2) Select the function code with the 10-digit key (copy quantity set key).

• The number of the selected function blinks on the digit of 10 on the copy quantity display.

• For auto clear, select " 1. "

• For setting, refer to the following function codes.

Function name	Function code
Auto clear	1
Pre-heat	2
Auto shut off passing time	3
Stream feeding	4*
Auto shut off setting	5

[Cancel] If a wrong code is entered, press the clear key and enter the correct function code.

* SPF only

3) Press the COPY button.

• The number blinking on the digit of 10 of the coyp quantity display is lighted.

• The number of the current set code blinks on the digit of 1.

4) Select the setting code with 1-digit key (copy quantity set key).

• To set to 90 sec, select " 3. "

• For setting, refer to the following set codes.

Function name	Set code
Auto clear	0 (Cancel)
	1 (30 sec)
	*2 (60 sec)
	3 (90 sec)
	4 (120 sec)
Pre-heat	0 (30 sec)
	1 (60 sec)
	2 (90 sec)
Auto shut off	0 (2 min)
	*1 (5 min)
	2 (15 min)
	3 (30 min)
	4 (60 min)
	5 (120 min)
Stream feeding	0 (Cancel)
	*1 (Setting)
Auto shut off setting	0 (Cancel)
	*1 (Setting)

* Factory setting

• The number blinking on the digit of 1 of the copy quantity display is lit up. This means the setting is completed.

[Cancel] When a wrong number of the function code is set, press the clear key and perform the procedure again from step 2.

5) Press the COPY button.

• The number blinking on the digit of 1 of the copy quantity display is lit up. This means the setting is completed.

Note: To set another function, press the clear key after completion of this operation and perform the procedure from step 2.

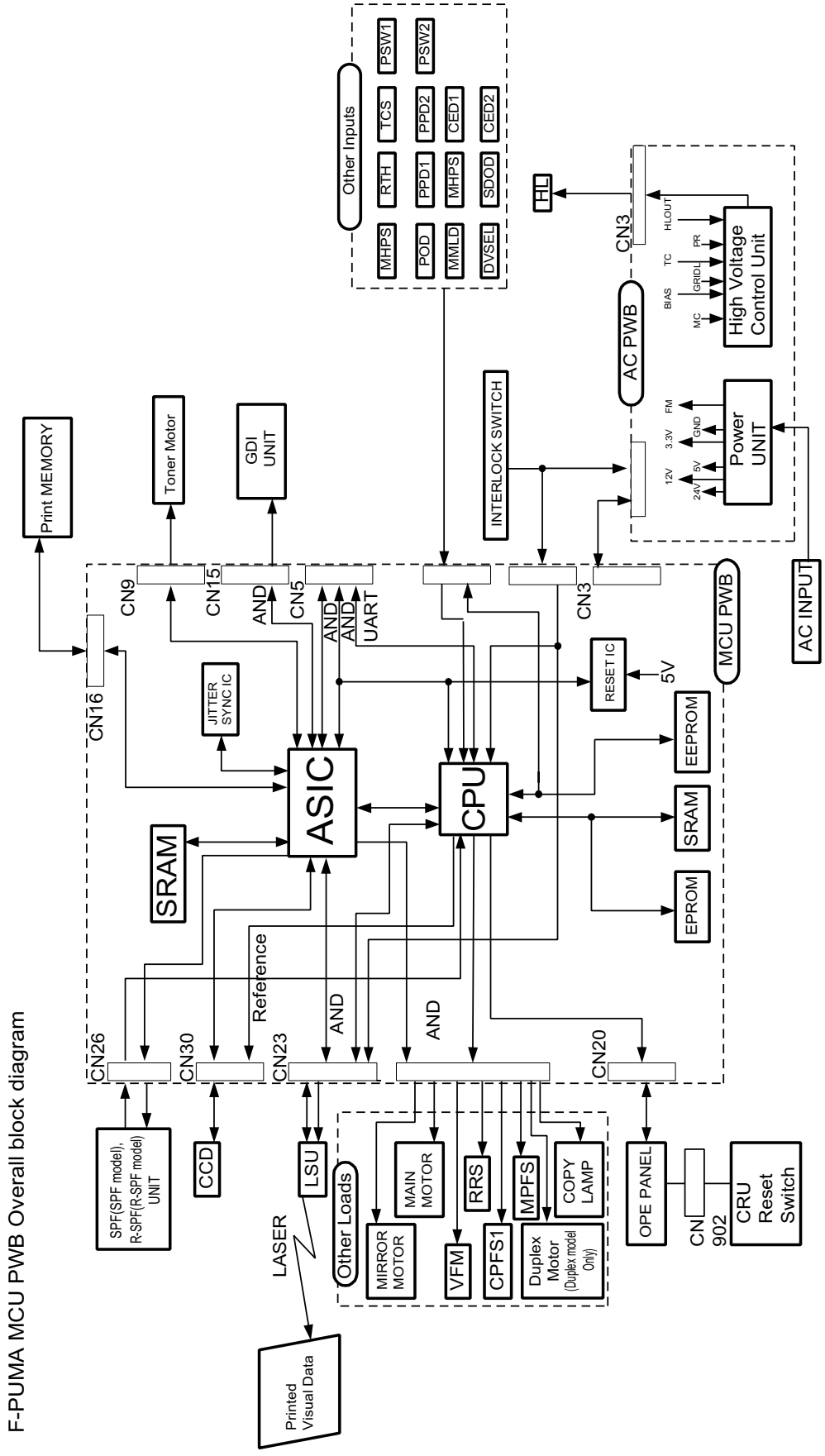
6) Press either one of the exposure adjustment keys (or) to complete the setting.

• Display lamps (, ,) go off and the copy quantity display returns to the normal state.

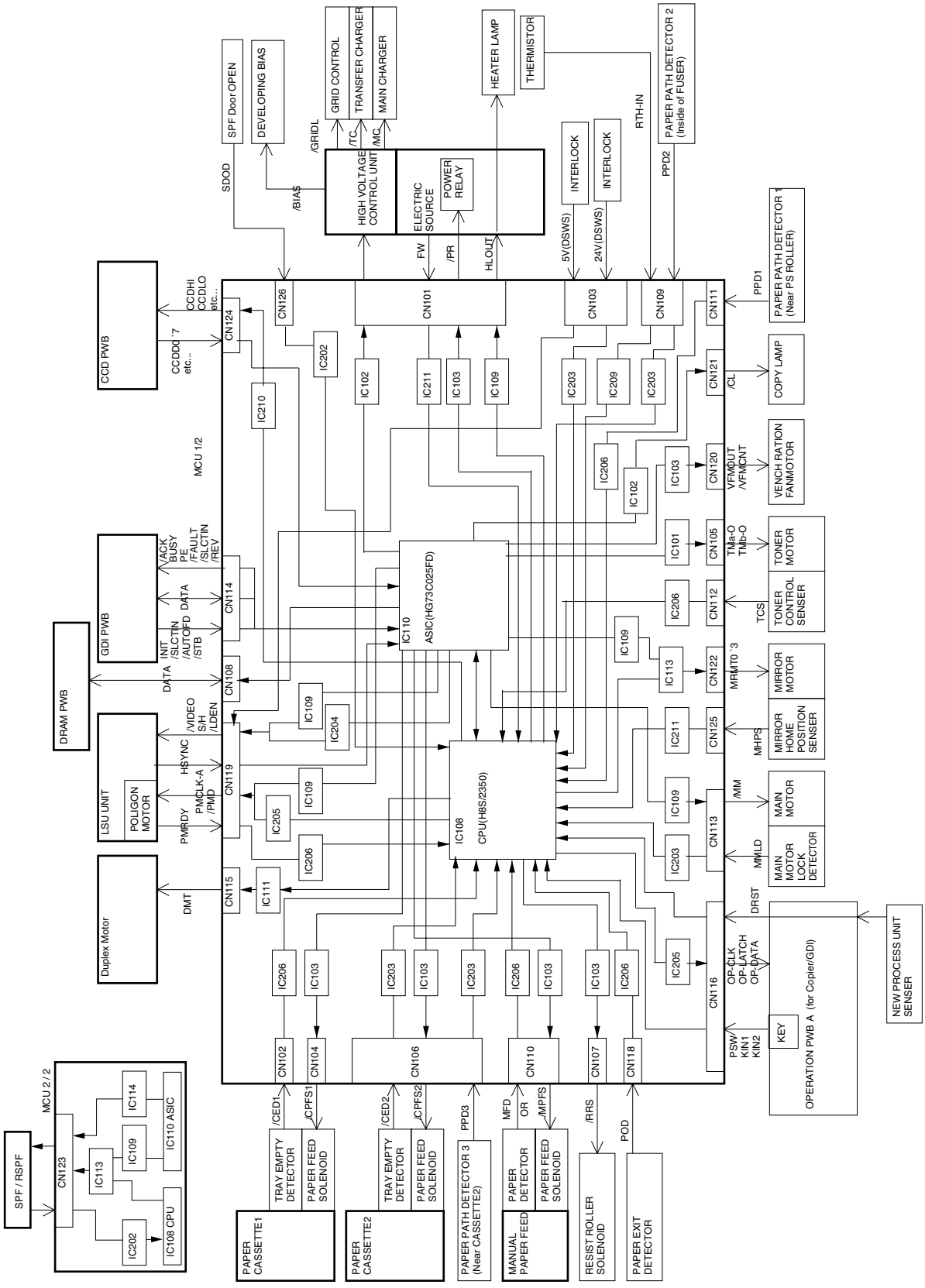
[12]ELECTRICAL SECTION

1. Block diagram

A. Overall block diagram



B. MCU PWB unit



2. Circuit descriptions

A. Man PWB (MCU)

(1) CPU signal table

PIN No.	Signal code	Input/output	Operating
1	/CS1	Output	Chip Select for SRAM
2	/CS0	Output	Chip Select for EPROM
3			D-GND
4			D-GND
5			5V
6	A0	Output	Address Bus (NC-pull up)
7	A1	Output	Address Bus
8	A2	Output	Address Bus
9	A3	Output	Address Bus
10			D-GND
11	A4	Output	Address Bus
12	A5	Output	Address Bus
13	A6	Output	Address Bus
14	A7	Output	Address Bus
15	A8	Output	Address Bus
16	A9	Output	Address Bus
17	A10	Output	Address Bus
18	A11	Output	Address Bus
19			D-GND
20	A12	Output	Address Bus
21	A13	Output	Address Bus
22	A14	Output	Address Bus
23	A15	Output	Address Bus
24	A16	Output	Address Bus
25	A17	Output	Address Bus
26	A18	Output	Address Bus
27	A19	Output	Address Bus (NC-pull up)
28			D-GND
29	A20	Output	Address Bus (NC-pull up)
30			NC-pull up
31	(SPPD)	Interruption level input	SPF Paper Pass Detector
32	USB-IN	Input	USB Connector-In Detect
33	(MHPS)	Interruption level input	Mirror Home Position Sensor
34	/CPU SYNC	Interruption level input	Horizontal Synchronous (from G/A)
35			D-GND
36			D-GND
37	ZC	Interruption level input	Zero-cross signal
38	/ASICINT	Interruption level input	Interrupt from G/A
39			5V
40	D0	Data input/ output	Data Bus
41	D1	Data input/ output	Data Bus
42	D2	Data input/ output	Data Bus
43	D3	Data input/ output	Data Bus
44			D-GND
45	D4	Data input/ output	Data Bus
46	D5	Data input/ output	Data Bus
47	D6	Data input/ output	Data Bus
48	D7	Data input/ output	Data Bus
49	D8	Data input/ output	Data Bus
50	D9	Data input/ output	Data Bus
51	D10	Data input/ output	Data Bus
52	D11	Data input/ output	Data Bus
53			D-GND
54	D12	Data input/ output	Data Bus
55	D13	Data input/ output	Data Bus
56	D14	Data input/ output	Data Bus
57	D15	Data input/ output	Data Bus
58			5V
59	(OPDATA)	Output	Data Signal for Operation Panel
60	FTXD	Output	TXD for Additional Board
61	FRTS	Output	RTS for Additional Board
62	FRXD	Input	RXD for Additional Board
63	(OP-CLK)	Output	Clock for Operation Panel
64	TMON	Output	Power Supply Signal for Toner Motor Driver IC
65			D-GND
66	FCTS	Input	CTS for Additional Board
67			D-GND
68			D-GND
69	PSW	Input	Print switch input
70	KIN1	Input	Key input 1
71	KIN2	Input	Key input 2
72	TMCLK	Timer output	Clock for Toner Motor
73	/TMEN	Output	On-Off Control for Toner Motor
74	/POFF	Output	Power Off Signal for Additional Board
75	PMCLK	Timer output	Clock for Polygon Motor
76	/PRSTART	Output	Printing Start Signal
77	/SCANSP	Output	Scanning Stop Signal
78	/SCANST	Output	Scanning Start Signal
79	HL	Output (Timer output)	On-Off Control for Heater Lamp
80	WDTOVF-	Output	Watchdog Timer
81	RES-	Input	Reset
82		Input	pull up
83		Input	pull up
84			5V
85	XTAL		Clock
86	EXTAL		Clock
87			D-GND
88	CPUCLK	Output	System Clock for G/A
89			5V
90	/AS	Output	pull up
91	/RD	Output	Read Signal
92	/HWR	Output	Write Signal (High Address)

PIN No.	Signal code	Input/output	Operating
93	/LWR	Output	Write Signal (Low Address)
94	SELIN3	Output	Input select 3
95	SELIN2	Output	Input select 2
96	SELIN1	Output	Input select 1
97	PR	Output	Power relay control PR
98	RRS	Output	Resist roller solenoid RPC
99			D-GND
100			D-GND
101	SCLK	Output	Clock Line for EEPROM
102	SDA	Output	Data Line for EEPROM
103			A5V
104			Analog Reference Voltage-A5V
105	RTH	Analog input	Fusing Thermister
106			
107	SIN1	Input	Sensor input 1
108	SIN2	Input	Sensor input 2
109	SIN3	Input	Sensor input 3
110	SIN4	Input	Sensor input 4
111	DAH	Analog output	Reference Voltage (High) for CCD
112	DAL	Analog output	Reference Voltage (Low) for CCD
113			AN-GND
114			D-GND
115	DMT-3	Motor output	Duplex Motor Excitement
116	DMT-2	Motor output	Duplex Motor Excitement
117	DMT-1	Motor output	Duplex Motor Excitement
118	DMT-0	Motor output	Duplex Motor Excitement
119	MRMT3	Motor output	Mirror Motor Excitement
120	MRMT2	Motor output	Mirror Motor Excitement
121	MRMT1	Motor output	Mirror Motor Excitement
122	MRMT0	Motor output	Mirror Motor Excitement
123		Input	CPU MODE SET <MODE 4> - GND
124		Input	CPU MODE SET <MODE 4> - GND
125		Input	CPU MODE SET <MODE 4> - Vcc
126			NC-pull up
127	DRST	Input	Drum reset detection
128	/CS2	Output	Chip Select for ASIC

* The signals which are hatched are added or revised to or from the AL-1000.

(2) ASIC (Signal table)

PIN No.	Signal name	IN/OUT	Connected to	Description
1	/SCANSP	IN	CPU (I/O)	Scanner process interrupt signal
2	/PRSTART	IN	CPU	Print start trigger signal
3	/TMEN	IN	CPU	Toner motor ON/OFF
4	TMCLK	IN	CPU	Toner motor reference clock
5	3.3V	Power		
6	CPUAD7	IN	CPU	CPU address bus
7	CPUAD6	IN	CPU	CPU address bus
8	GND	Power		
9	CPUAD5	IN	CPU	CPU address bus
10	CPUAD4	IN	CPU	CPU address bus
11	CPUAD3	IN	CPU	CPU address bus
12	CPUAD2	IN	CPU	CPU address bus
13	CPUAD1	IN	CPU	CPU address bus
14	/CPUSYNC	OUT	CPU	Horizontal synchronization signal
15	/ASICINT	OUT	CPU	Interruption request signal
16	/CS2	IN	CPU	CPU chip select signal
17	/RESET	IN	RESET IC	Reset signal
18	5V	Power		
19	GND	Power		
20	3.3V	Power		
21	GND	Power		
22	MDATA15	IN/OUT	DRAM	Data bus of DRAM (page memory)
23	MDATA14	IN/OUT	DRAM	Data bus of DRAM (page memory)
24	MDATA13	IN/OUT	DRAM	Data bus of DRAM (page memory)
25	MDATA12	IN/OUT	DRAM	Data bus of DRAM (page memory)
26	MDATA11	IN/OUT	DRAM	Data bus of DRAM (page memory)
27	MDATA10	IN/OUT	DRAM	Data bus of DRAM (page memory)
28	MDATA9	IN/OUT	DRAM	Data bus of DRAM (page memory)
29	MDATA8	IN/OUT	DRAM	Data bus of DRAM (page memory)
30	MDATA7	IN/OUT	DRAM	Data bus of DRAM (page memory)
31	3.3V	Power		
32	MDATA6	IN/OUT	DRAM	Data bus of DRAM (page memory)
33	MDATA5	IN/OUT	DRAM	Data bus of DRAM (page memory)
34	GND	Power		
35	MDATA4	IN/OUT	DRAM	Data bus of DRAM (page memory)
36	MDATA3	IN/OUT	DRAM	Data bus of DRAM (page memory)
37	MDATA2	IN/OUT	DRAM	Data bus of DRAM (page memory)
38	MDATA1	IN/OUT	DRAM	Data bus of DRAM (page memory)
39	MDATA0	IN/OUT	DRAM	Data bus of DRAM (page memory)
40	/RAS0	OUT	DRAM	RAS signal 0 of DRAM (page memory)
41	/RAS1	OUT	DRAM	RAS signal 1 of DRAM (page memory)
42	/RAS2	OUT	DRAM	RAS signal 2 of DRAM (page memory)
43	/RAS64	OUT	DRAM control (for panther)	(Reserved)
44	3.3V	Power		
45	/RAS16	OUT	DRAM control (for panther)	(Reserved)
46	MAD0	OUT	DRAM	Address bus of DRAM (page memory)
47	GND	Power		
48	MAD1	OUT	DRAM	Address bus of DRAM (page memory)
49	MAD2	OUT	DRAM	Address bus of DRAM (page memory)
50	MAD3	OUT	DRAM	Address bus of DRAM (page memory)
51	MAD4	OUT	DRAM	Address bus of DRAM (page memory)
52	MAD5	OUT	DRAM	Address bus of DRAM (page memory)
53	MAD6	OUT	DRAM	Address bus of DRAM (page memory)
54	MAD7	OUT	DRAM	Address bus of DRAM (page memory)
55	MAD8	OUT	DRAM	Address bus of DRAM (page memory)
56	MAD9	OUT	DRAM	Address bus of DRAM (page memory)
57	3.3V	Power		
58	MAD10	OUT	DRAM	Address bus of DRAM (page memory)

PIN No.	Signal name	IN/OUT	Connected to	Description
59	MAD11	OUT	DRAM	Address bus of DRAM (page memory)
60	GND	Power		
61	/CAS0	OUT	DRAM	CAS signal of DRAM (page memory)
62	/CAS1	OUT	DRAM	CAS signal of DRAM (page memory)
63	/OE	OUT	DRAM	Read enable signal of DRAM (page memory)
64	/WE	OUT	DRAM	Write enable signal of DRAM (page memory)
65	OUTD0	OUT	Reserved	
66	OUTD1	OUT	Reserved	
67	OUTD2	OUT	Reserved	
68	OUTD3	OUT	Reserved	
69	3.3V	Power		
70	OUTD4	OUT	Reserved	
71	OUTD5	OUT	Reserved	
72	GND	Power		
73	OUTD6	OUT	Reserved	
74	OUTD7	OUT	Reserved	
75	OUTD8	OUT	Reserved	
76	OUTD9	OUT	Reserved	
77	OUTD10	OUT	Reserved	
78	OUTD11	OUT	Reserved	
79	OUTD12	OUT	Reserved	
80	OUTD13	OUT	Reserved	
81	OUTD14	OUT	Reserved	
82	OUTD15	OUT	Reserved	
83	/HSYNC	OUT	PCL board	Horizontal sync signal with print area output only
84	/PCLPRD	IN	PCL board	Print video data (serial) from PCL board
85	/PCLREQ	OUT	PCL board	DREQ signal to PCL board
86	/PCLACK	IN	PCL board	ACK signal from PCL board
87	/PCLCS	IN	PCL board	
88	3.3V	Power		
89	GND	Power		
90	5V	Power		
91	GND	Power		
92	/FAXPRD	IN	Reserved	
93	/FAXREQ	OUT	Reserved	
94	/FAXACK	IN	Reserved	
95	3.3V	Power		
96	/FAXCS	IN	Reserved	
97	/ESPRD	IN	Electric sort board*(Reserved)	(Reserved)
98	GND	Power		
99	/ESREQ	OUT	Electric sort board*(Reserved)	(Reserved)
100	/ESACK	IN	Electric sort board*(Reserved)	(Reserved)
101	/ESCS	IN	Electric sort board*(Reserved)	(Reserved)
102	PARAD0	IN/OUT	1284 board connector	DATA bus (IEEE1284 communication port)
103	PARAD1	IN/OUT	1284 board connector	DATA bus (IEEE1284 communication port)
104	PARAD2	IN/OUT	1284 board connector	DATA bus (IEEE1284 communication port)
105	PARAD3	IN/OUT	1284 board connector	DATA bus (IEEE1284 communication port)
106	PARAD4	IN/OUT	1284 board connector	DATA bus (IEEE1284 communication port)
107	PARAD5	IN/OUT	1284 board connector	DATA bus (IEEE1284 communication port)
108	5V	Power		
109	PARAD6	IN/OUT	1284 board connector	DATA bus (IEEE1284 communication port)
110	PARAD7	IN/OUT	1284 board connector	DATA bus (IEEE1284 communication port)
111	GND	Power		
112	/REV	OUT	1284 board connector	ECP mode I/O select (LOW:P → H)
113	INIT	IN	1284 board connector	INIT signal (IEEE1284 communication port)
114	/SLCTIN	IN	1284 board connector	/SLCTIN signal (IEEE1284 communication port)

PIN No.	Signal name	IN/OUT	Connected to	Description
115	/AUTOFD	IN	1284 board connector	/AUTOFD signal (IEEE1284 communication port)
116	/STB	IN	1284 board connector	/STB signal (IEEE1284 communication port)
117	/ACK	OUT	1284 board connector	/ACK signal (IEEE1284 communication port)
118	BUSY	OUT	1284 board connector	BUSY signal (IEEE1284 communication port)
119	PE	OUT	1284 board connector	PE signal (IEEE1284 communication port)
120	/FAULT	OUT	1284 board connector	/FAULT signal (IEEE1284 communication port)
121	5V	Power		
122	SLCT	OUT	1284 board connector	/SLCTIN signal (IEEE1284 communication port)
123	/TESTPIN0	IN	TEST PIN	High: Normal Low: Test
124	GND	Power		
125	PFCLK	IN	Tansmitter	Write clock
126	/TESTPIN1	IN	TEST PIN	High: Normal Low: Test
127	/SYNCEN	OUT	JITTER ADJUSTMENT IC	Jitter adjustment IC trigger signal
128	SD10	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
129	SD11	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
130	SD12	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
131	SD13	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
132	SD14	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
133	5V	Power		
134	SD15	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
135	SD16	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
136	GND	Power		
137	SD17	IN/OUT	SRAM (separation)	Data line to SRAM before are separation
138	SOE1	OUT	SRAM(separation)	Read enable line to SRAM before area separation
139	SWE1	OUT	SRAM(separation)	Write enable line to SRAM before area separation
140	SCS1	OUT	SRAM(separation)	Chip select line to SRAM before area separation
141	SOE0	OUT	SRAM(separation)	Read enable line to SRAM before area separation
142	SWE0	OUT	SRAM(separation)	Write enable line to SRAM before area separation
143	SCS0	OUT	SRAM(separation)	Chip select line to SRAM before area separation
144	SD00	IN/OUT	SRAM(separation)	Data line to SRAM before are separation
145	SD01	IN/OUT	SRAM(separation)	Data line to SRAM before are separation
146	5V	Power		
147	SD02	IN/OUT	SRAM(separation)	Data line to SRAM before are separation
148	SD03	IN/OUT	SRAM(separation)	Data line to SRAM before are separation
149	GND	Power		
150	SD04	IN/OUT	SRAM(separation)	Data line to SRAM before are separation
151	SD05	IN/OUT	SRAM(separation)	Data line to SRAM before are separation
152	SD06	IN/OUT	SRAM(separation)	Data line to SRAM before are separation
153	SD07	IN/OUT	SRAM(separation)	Data line to SRAM before are separation
154	SAD0	OUT	SRAM(separation)	Address line to SRAM before area separation
155	SAD1	OUT	SRAM(separation)	Address line to SRAM before area separation
156	SAD2	OUT	SRAM(separation)	Address line to SRAM before area separation
157	SAD3	OUT	SRAM(separation)	Address line to SRAM before area separation
158	SAD4	OUT	SRAM(separation)	Address line to SRAM before area separation
159	SAD5	OUT	SRAM(separation)	Address line to SRAM before area separation
160	SAD6	OUT	SRAM(separation)	Address line to SRAM before area separation
161	SAD7	OUT	SRAM(separation)	Address line to SRAM before area separation
162	GND	Power		
163	SAD8	OUT	SRAM(separation)	Address line to SRAM before area separation
164	SAD9	OUT	SRAM(separation)	Address line to SRAM before area separation
165	SAD10	OUT	SRAM(separation)	Address line to SRAM before area separation
166	SAD11	OUT	SRAM(separation)	Address line to SRAM before area separation
167	SAD12	OUT	SRAM(separation)	Address line to SRAM before area separation
168	SAD13	OUT	SRAM(separation)	Address line to SRAM before area separation
169	/f1	OUT	CCD PWB	CCD drive signal transfer clock (First phase)
170	/f2	OUT	CCD PWB	CCD drive signal transfer clock (Second phase)
171	/SH	OUT	CCD PWB	CCD drive signal shift pulse
172	5V	Power		
173	RS	OUT	CCD PWB	CCD drive signal reset pulse

PIN No.	Signal name	IN/OUT	Connected to	Description
174	SP	OUT	CCD PWB	CCD drive signal sampling hold pulse
175	GND	Power		
176	CP	OUT	CCD PWB	A/D conversion IC latch clock
177	BCLK	OUT	CCD PWB	CCD shield output latch signal
178	IDIN0	IN	CCD PWB (AD conversion)	Image scan data (after 8bit A/D conversion)
179	IDIN1	IN	CCD PWB (AD conversion)	Image scan data (after 8bit A/D conversion)
180	IDIN2	IN	CCD PWB (AD conversion)	Image scan data (after 8bit A/D conversion)
181	IDIN3	IN	CCD PWB (AD conversion)	Image scan data (after 8bit A/D conversion)
182	IDIN4	IN	CCD PWB (AD conversion)	Image scan data (after 8bit A/D conversion)
183	IDIN5	IN	CCD PWB (AD conversion)	Image scan data (after 8bit A/D conversion)
184	IDIN6	IN	CCD PWB (AD conversion)	Image scan data (after 8bit A/D conversion)
185	5V	Power		
186	IDIN7	IN	CCD PWB (AD conversion)	Image scan data (after 8bit A/D conversion)
187	/SDCLK	OUT	CHECK	Effective image area signal
188	GND	Power		
189	SFCLK	IN	Transmitter	CCD drive clock (48MHz), Also used as an internal clock.
190	TEST port 0	IN	AUTO SCAN TEST	High: Normal Low: Test
191	/SYNC	IN	LSU	Horizontal synchronization signal (HSYNC) from LSU
192	/LD	OUT	LSU	Laser drive signal
193	/LEND	OUT	LSU	Laser APC signal
194	USB-EN	OUT	GDI/USB PWB	USB port enable signal
195	1284-EN	OUT	GDI/USB PWB	1284 port enable signal
196	PORTOUT26	OUT		(Not used)
197	3.3V	Power		
198	PORTOUT25	OUT		(Not used)
199	PORTOUT24	OUT		(Not used)
200	GND	Power		
201	SGS	OUT	Tr array IC	SPF gate solenoid
202	SRRC	OUT	Tr array IC	SPF resist roller solenoid
203	SPUS	OUT	Tr array IC	SPF PU solenoid
204	/READY	OUT	Reserved	
205	OP-LATCH	OUT	Tr array IC	Latch signal for operation circuit. Data latch at LOW.
206	MRPS2	OUT	Tr array IC	Mirror speed control signal. Mirror speed 2 at LOW.
207	MRPS1	OUT	Tr array IC	Mirror speed control signal. Mirror speed 1 at LOW.
208	SPFS	OUT	Tr array IC	SPF paper feed solenoid
209	SMSEL	OUT	Tr array IC	SPF motor/Mirror motor select signal
210	3.3V	Power		
211	TC	OUT	Tr array IC	Transfer charger control signal. ON at HIGH.
212	GRIDL	OUT	Tr array IC	Main charger grid control signal. ON at HIGH.
213	GND	Power		
214	MC	OUT	Tr array IC	Main charger control signal. ON at HIGH.
215	BIASL	OUT	Tr array IC	DV bias voltage control signal. ON at HIGH.
216	BIASH	OUT	Tr array IC	DV bias voltage control signal. ON at HIGH.
217	BIAS	OUT	Tr array IC	DV bias output control signal. ON at HIGH.
218	CL	OUT	Tr array IC	Copy lamp control signal. ON at HIGH.
219	VFMCNT	OUT	Tr array IC	Ventilation fan rotating speed control signal. Low speed at HIGH, high speed at LOW.
220	VFM	OUT	Tr array IC	Ventilation fan control signal. Fan ON at HIGH.
221	LDEN	OUT	Tr array IC	Laser circuit control signal. Laser circuit ON at HIGH.
222	PMD	OUT	Tr array IC	Polygon motor control signal. Polygon motor ON at HIGH.
223	5V	Power		
224	MM	OUT	Tr array IC	Main motor control signal. Main motor ON at HIGH.
225	MPFS	OUT	Tr array IC	Manual paper feed solenoid control signal. Multi paper feed ON at HIGH.

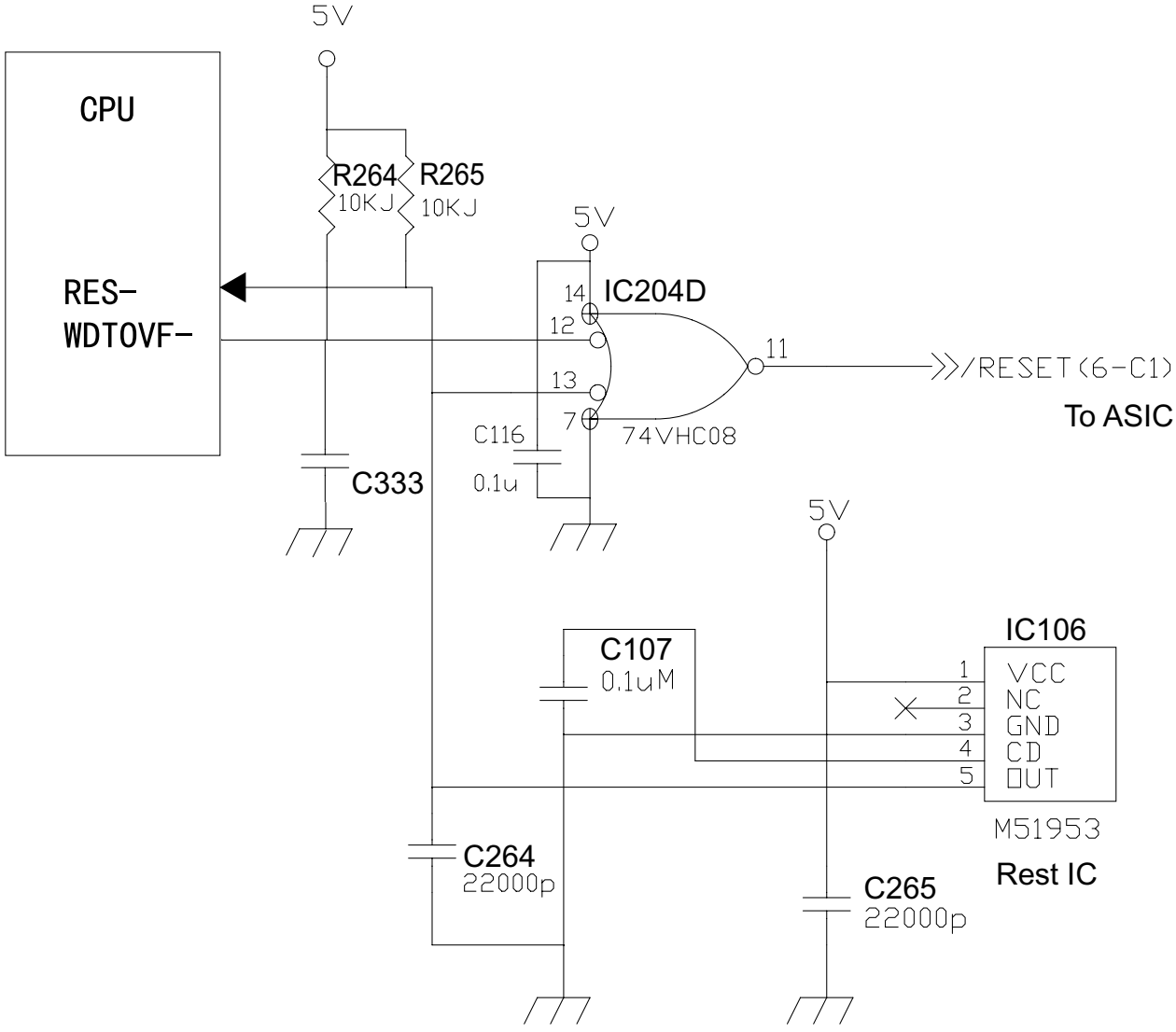
PIN No.	Signal name	IN/OUT	Connected to	Description
226	GND	Power		
227	CPFS2	OUT	Tr array IC	Second cassette paper feed solenoid control signal. Second cassette paper feed at HIGH.
228	CPFS1	OUT	Tr array IC	Cassette paper feed solenoid control signal. One-stage cassette paper feed at HIGH.
229	TM	OUT	Tr array IC	Toner motor drive output (+)
230	TM_	OUT	Tr array IC	Toner motor drive output (-)
231	CPUD15	IN/OUT	CPU	CPU data bus
232	CPUD14	IN/OUT	CPU	CPU data bus
233	CPUD13	IN/OUT	CPU	CPU data bus
234	CPUD12	IN/OUT	CPU	CPU data bus
235	CPUD11	IN/OUT	CPU	CPU data bus
236	5V	Power		
237	CPUD10	IN/OUT	CPU	CPU data bus
238	CPUD9	IN/OUT	CPU	CPU data bus
239	GND	Power		
240	CPUD8	IN/OUT	CPU	CPU data bus
241	CPUD7	IN/OUT	CPU	CPU data bus
242	CPUD6	IN/OUT	CPU	CPU data bus
243	CPUD5	IN/OUT	CPU	CPU data bus
244	CPUD4	IN/OUT	CPU	CPU data bus
245	CPUD3	IN/OUT	CPU	CPU data bus
246	CPUD2	IN/OUT	CPU	CPU data bus
247	CPUD1	IN/OUT	CPU	CPU data bus
248	CPUD0	IN/OUT	CPU	CPU data bus
249	3.3V	Power		
250	/CPUWR	IN	CPU	CPU write signal
251	/CPURD	IN	CPU	CPU read signal
252	GND	Power		
253	CPUCLK	IN	CPU	CPU system clock
254	GND	Power		
255	TEST PORT1	IN	AUTO SCAN TEST	High: Normal Low: Test
256	/SCANST	IN	CPU(I/O)	Scanner process start signal

* The signals which are hatched are added or revised to or from AL-1000.

3. Reset circuit

This circuit detects ON/OFF of power to control start/stop of each circuit. The 5V voltage of the main PWB is detected by the reset IC to generate the reset signal.

When the power voltage reaches the specified level, the circuit operations are started. Before the power voltage falls below the specified level, the circuit operations are stopped to prevent against malfunctions.

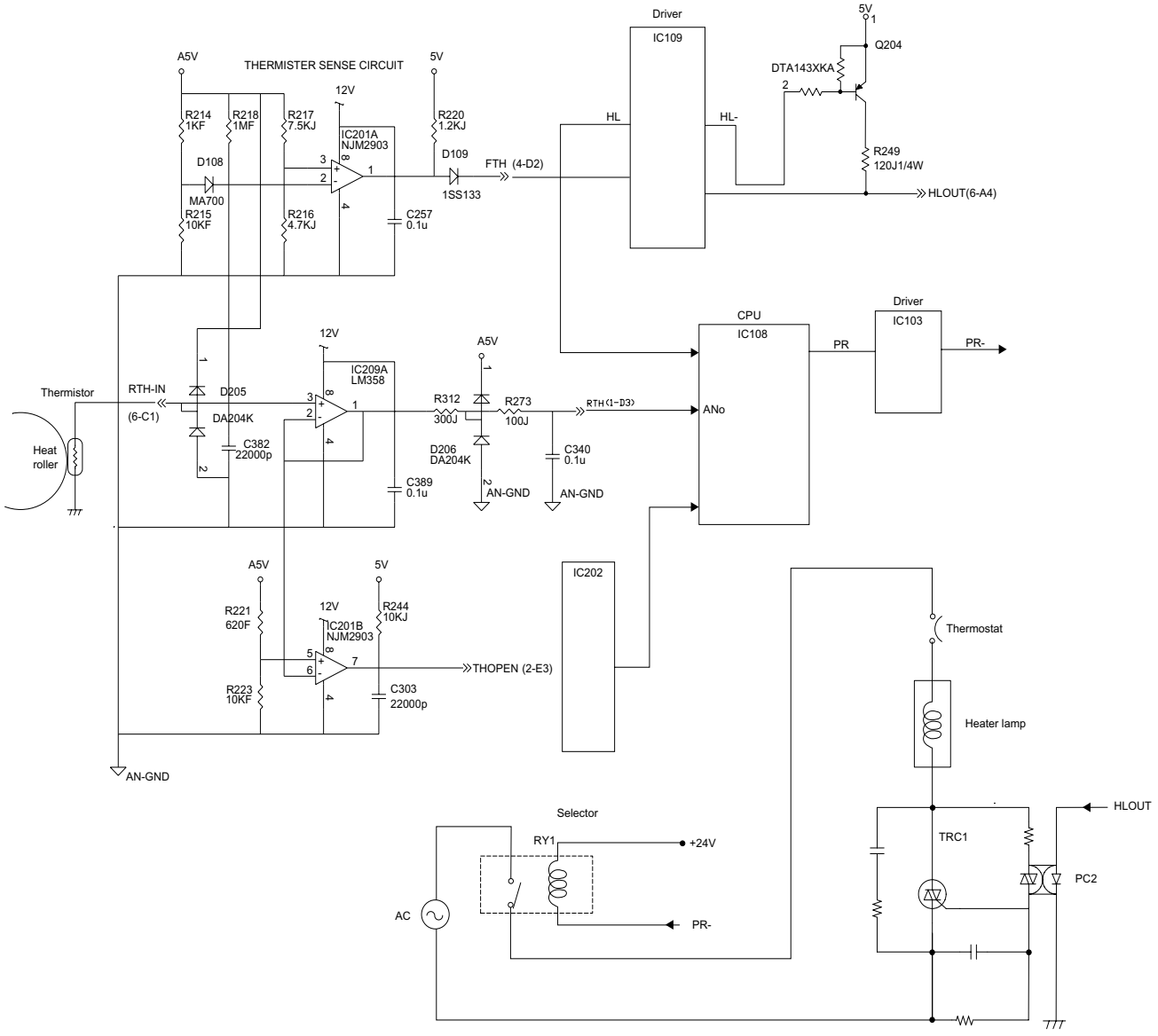


4. Heater lamp control circuit

A. Outline

The heater lamp control circuit detects the heat roller surface temperature and converts in into a voltage level, which is inputted to the CPU analog input pin.

The CPU converts the analog voltage into a digital signal level and compares it with the set value of the simulation to turn on/off the heater lamp according to the level, maintaining the heat roller surface temperature at a constant level.



The lower the heat roller surface temperature is, the greater the thermistor resistance is, and vise versa.

Therefore, the lower the heat roller surface temperature is, the higher the thermistor terminal voltage is, and vise versa. The thermistor terminal voltage is inputted to the CPU analog port.

The CPU controls ON/OFF of the heater lamp by this input voltage level.

(1) High temperature protect circuit in case of CPU hung up

For IC119 3pin (reference voltage), +5V is divided by the resistor.
The thermistor terminal voltage is inputted to IC119 2pin.
When, the voltage at 2pin becomes lower than the voltage at 3pin (when the heat roller temperature is about 220 - 230°C), IC119 1pin becomes HIGH, and the HL signal is lowered to the GND potential through IC114, stopping generation of the heater lamp ON signal. (IC119 1pin is normal LOW.)

(2) When the heat roller surface temperature is lower than the set level

1) Since the thermistor terminal voltage is higher than the set level, the HL signal from the CPU becomes HIGH.
2) The HL signal is turned to be the HLOUT signal through IC114 protect circuit, and inputted to the photo triac coupler (PC2).
3) When the internal triac turns on, a pulse is applied to the gate of the external triac. Consequently a current flow from the power source through the heater lamp to the triac, lighting the heater lamp.

(3) When the heat roller surface temperature is higher than the set level

1) Since the thermistor terminal voltage becomes lower than the set value, the HL signal from the CPU becomes LOW.
2) The HL turns LOW, the PC2 turns OFF, the external triac turns OFF, and the heater lamp turns OFF.

(4) In case of the thermistor open

The voltage at IC119 6pin over the voltage at 5pin to drive the output THOPEN at 7pin to LOW. This is passed through the selector to the CPU and the trouble code "H2" is displayed.

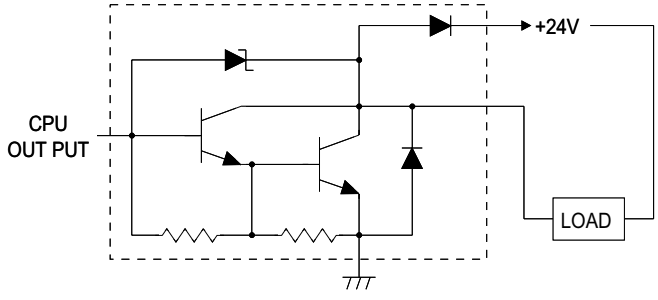
5. Driver circuit (Solenoid)

A. Outline

Since the control signal of each load outputted from the CPU cannot drive the load directly, it is passed through the driver IC to the load.

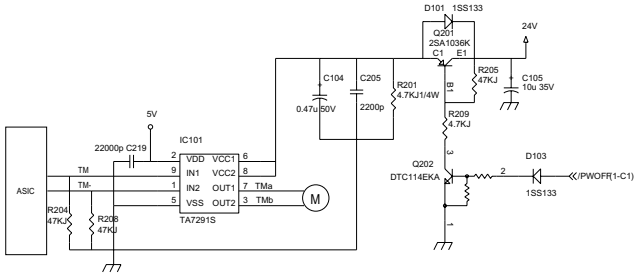
B. Operation

The driver circuit forms a Darlington circuit with transistors. Therefore a large drive current is obtained from a small current (CPU output current). When the driver input voltage is HIGH (+5V), the transistor turns ON to flow a current in the arrow direction, operating the load. When the driver is ON, the driver output terminal voltage is 0V.

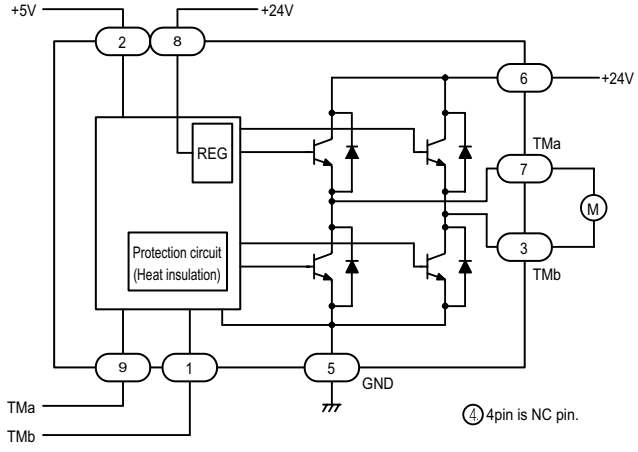


6. Toner supply motor drive circuit

The IC101 is the motor control IC, which generates the pseudo AC waveform with the pulse signals (TM, TM-) outputted from ASIC, driving the toner supply motor.

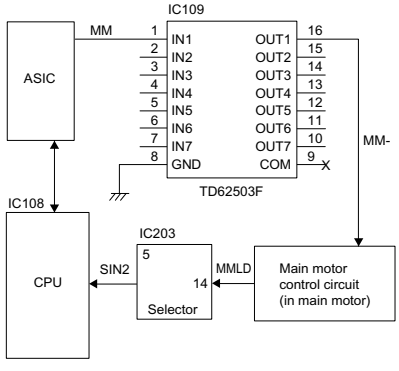


Internal circuit



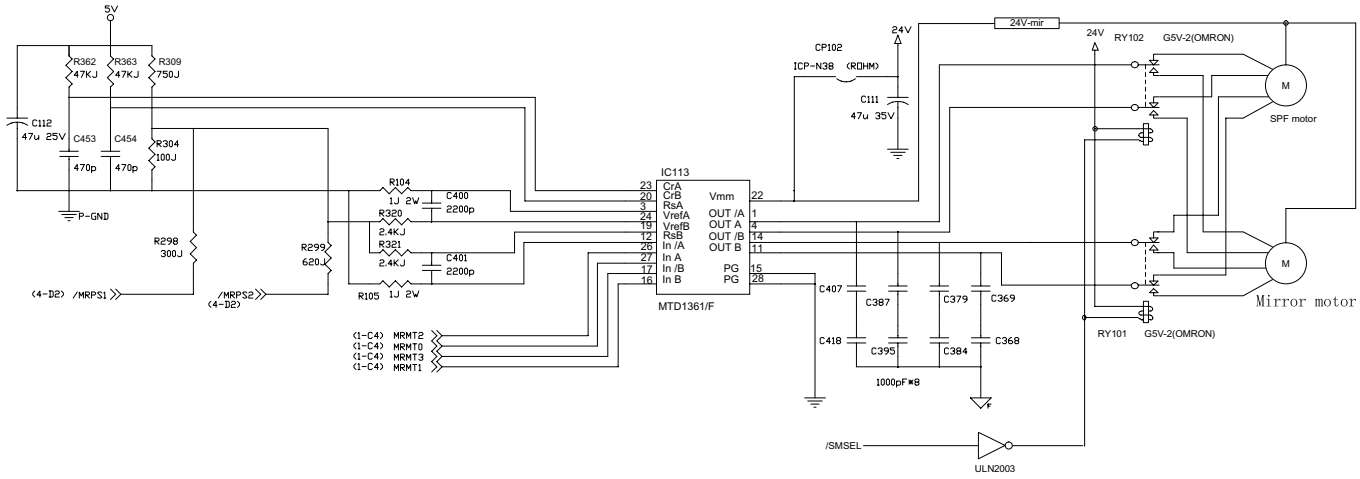
7. Main motor drive circuit

The main motor is driven by the MM signal from ASIC. While the main motor is rotating, the MM signal is driven to HIGH and passed through IC114 to the control circuit in the main motor to
rotate the main motor. The MMLD signal is kept HIGH until the main motor speed reaches the specified rpm, and passed through the selector to the CPU.



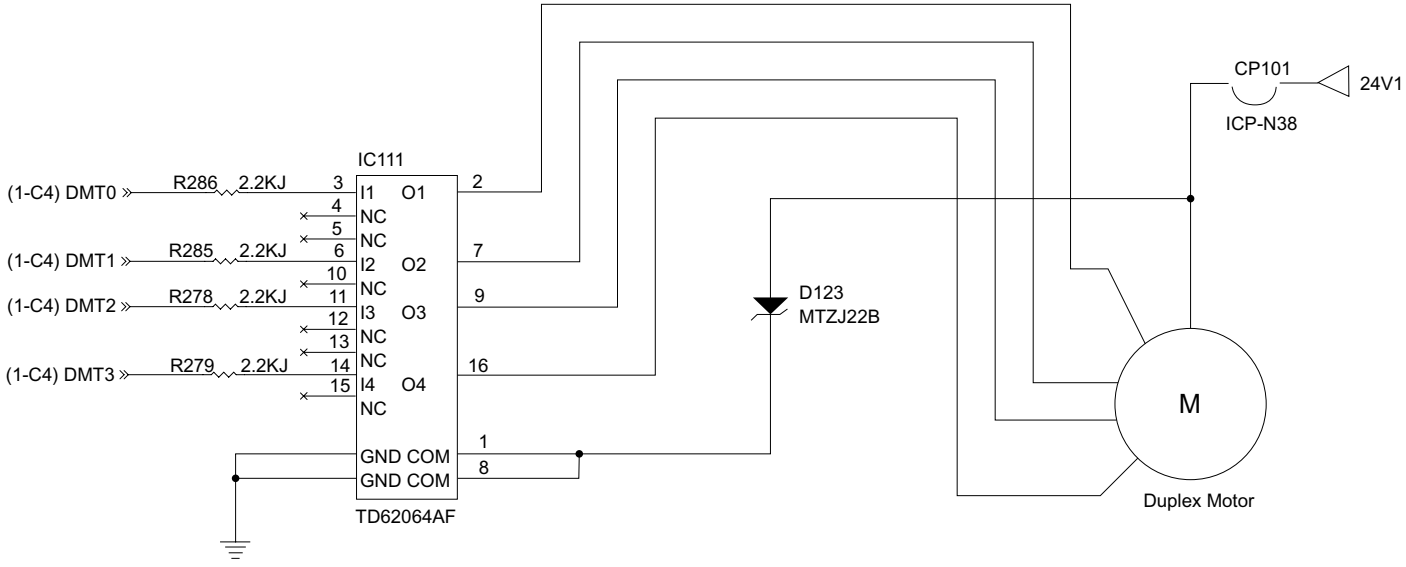
8. Mirror motor circuit

The mirror motor is a stepping motor. Its driver is IC113 constant-current chopper control IC (SLA7024). For control, the CPU outputs a drive signal to IC113 to drive the mirror motor by 1-2 phase excitement.
The SPF motor and the mirror motor are switched with relays RY1 and RY2. The switching signal is SMSEL-. When SMSEL- is LOW, a current flows through the SPF motor. When it is HIGH, a current flows through the mirror motor.



9. Duplex motor circuit

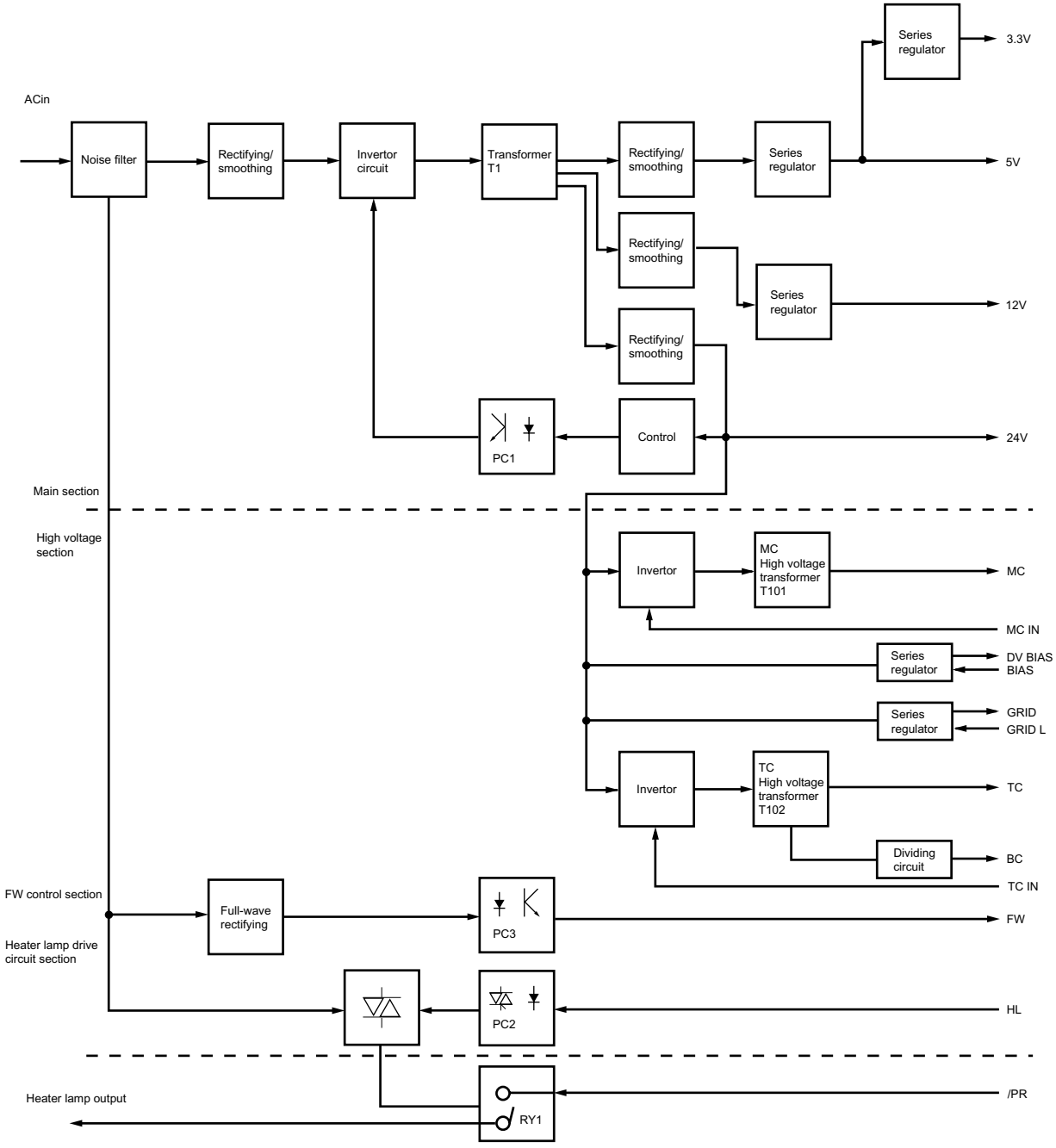
The duplex motor is a stepping motor. Its driver is IC111 darlington-sink transistor driver IC (TD62064AP). For control, the CPU outputs a drive signal to IC111 to drive the duplex motor by 1-2 phase excitement.



10.Power circuit block diagram

A. Block diagram

The power circuit is composed of the main section, the high voltage circuit, the FW signal section, and the heater lamp drive circuit.
The main section directly rectifies the AC power current and switch-converts with the DC/DC convertor, and rectifies again and smoothes to form each DC power.
In the high voltage circuit section, the 24V output of the main section is switch-converted by the DC/DC convertor and rectified and smoothed to form the high voltage output.
The FW signal section fullwave-rectifies the AC power to supply signal output at the timing of 0V.



B. Circuit descriptions

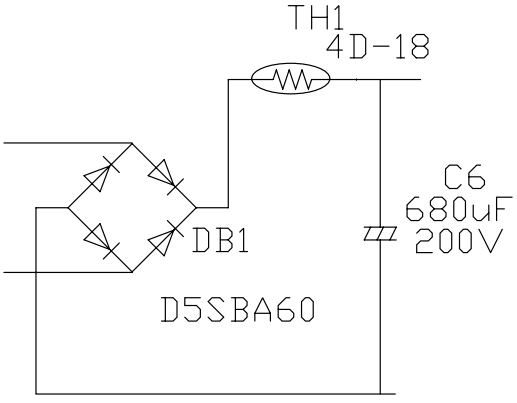
(1) Main section

a. Noise filter circuit

The noise filter circuit of the DC power is composed of L and C as shown in the figure below. It reduces normal mode noises and common mode noises which come from and go to the AC line.
The normal mode noises are noises which are generated in the AC line or the output line and are attenuated by C4B and C3. The common mode noises are noise voltages generated between the AC line and GND, and are attenuated by L1 and L2. The noise composition is bypassed to GND through C4 and C5.

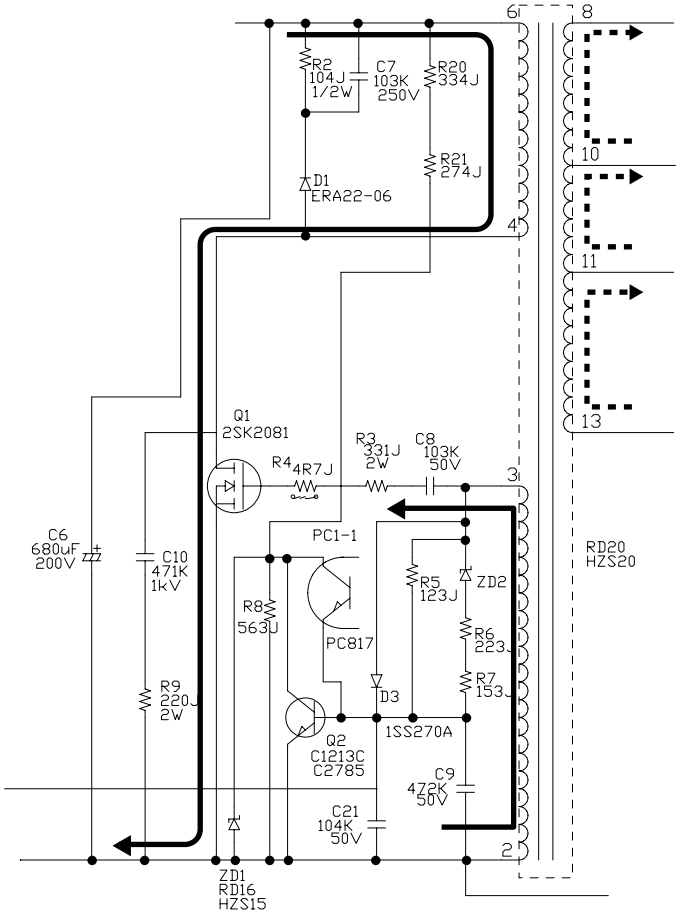
b. Rectifying/smoothing circuit

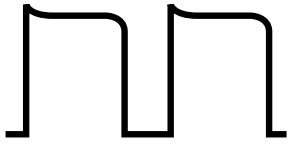
The AC voltage of 50(60)Hz is full-wave rectified by the rectifying diode DB1 and smoothed by the smoothing capacitor C6.
TH1 is the power thermistor which limits a rush current flowing to C6.



c. Invertor circuit

The DC voltage from the rectifying/smoothing circuit is supplied to the secondary side of transformer T1 by switching operation of FET Q1.
For switching, the RCC (Ringing Choke Convertor) system is employed.
FET Q1 is turned on by the starting resistors R20 and R1 to generate a voltage between terminals 4 and 6 of transformer T1 and between terminals 2 and 3 simultaneously. Then a voltage is applied to the gate of FET Q1 to oscillate high frequency.
The actual line in the circuit diagram shows the current to turn ON FET Q1, and the dotted line shows the current loop through which the energy accumulated in the transformer is discharged when FET Q1 is turned OFF.



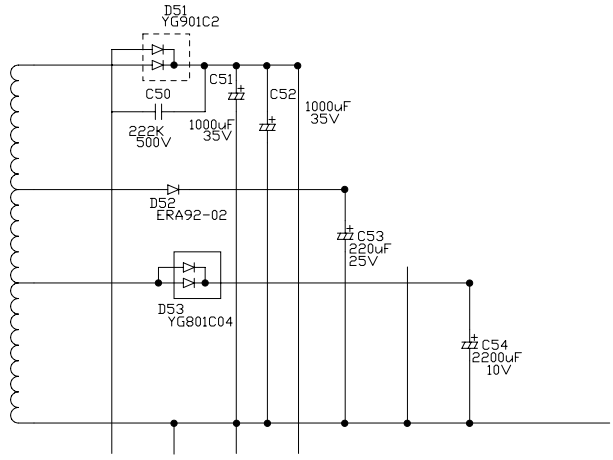


Voltage across Q1 drain and source (VDS)

Q1 drain current (ID)

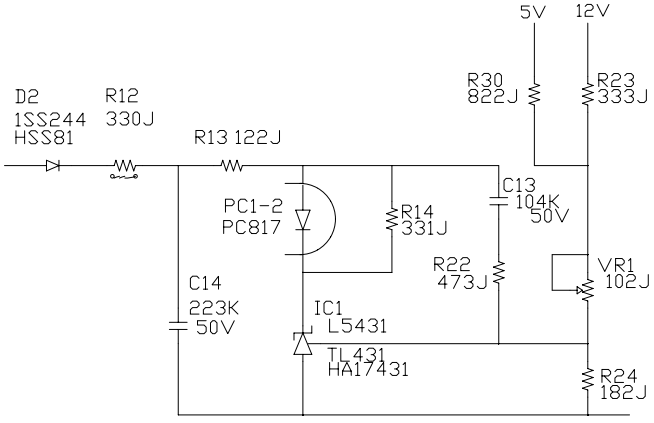
d. Rectifying/smoothing circuit on the secondary side

The high frequency pulse generated by the invertor circuit is dropped by transformer T1, rectified by diodes D51, D52, and D53, and smoothed by capacitors C51, C52, C53, and C54.



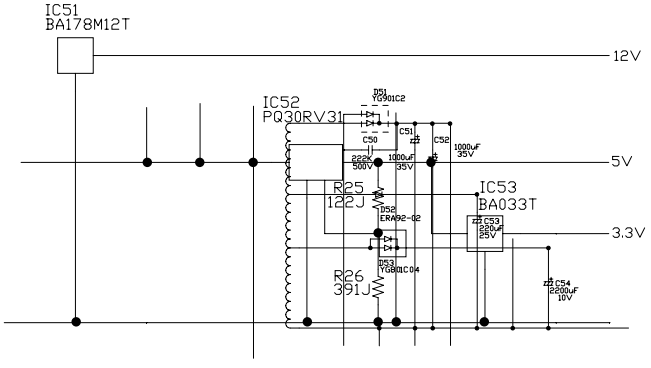
e. Control circuit

The secondary side outputs (24V series, 5V series) are detected by the output voltage detecting circuit, and the detected signal is fed-back through photo coupler PC1 to the control transistor Q2 to change the ON period of FET Q1 in the primary side invertor circuit, stabilizing the output voltage.



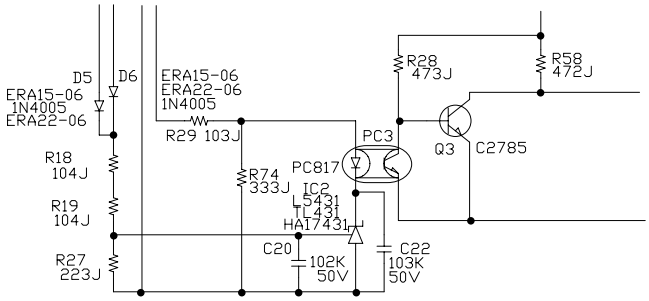
f. Series regulator circuit

This circuit stabilizes the output and protect against an overcurrent by the series regulator. The 12V is composed of IC51, the 5V is composed of IC52, the 3.3V is composed of IC53.

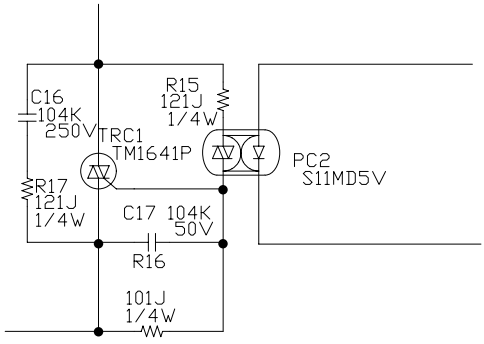


(2) FW signal

The AC input voltage is full-wave rectified by D5 and D6. When the voltage is divided by resistors R18, R19, and R27 and decreased below 2.5V, the shunt regulator IC7 is turned OFF to turn OFF photo coupler PC3, and turn ON transistor Q3. LOW level output of FW signal is provided.



(3) Heater lamp drive circuit



(4) High voltage section

a. Invertor circuit

The 24V output of the main section is inverted by the RCC system and the high frequency power is supplied to the secondary side of high voltage transformer T101 and T102. The diode and the capacitor for rectifying and smoothing are built in the secondary side of high voltage transformer T101 and T102 to provide DC outputs of high voltage. MC is turned ON/OFF by MC IN terminal, and TC is turned ON/OFF by TC IN terminal.

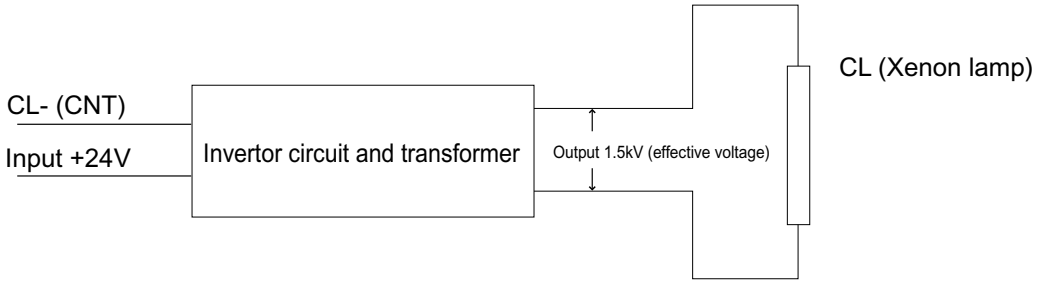
b. Series regulator

The GRID output of DV BIAS is applied from the MC output and dropped by the series regulator.
DV BIAS is turned ON/OFF by BIAS terminal, and the GRID voltage is switched by GRID L terminal.

c. Dividing circuit

BD OUT takes out a voltage from T102 and divides it with the resistor and outputs it.

11.CL invertor PWB (circuit)



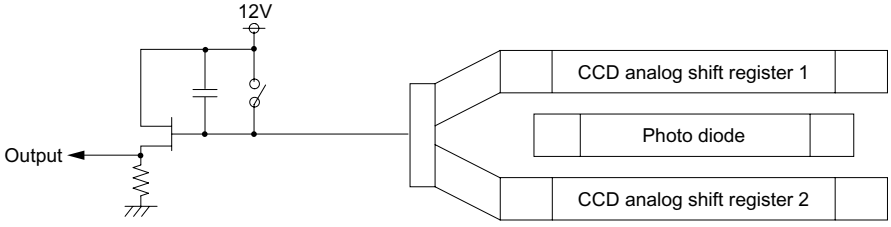
A. Circuit description

The Two transistors connected in series to the transformer are switched on/off by the control signal (CL-) from the MCU. By this switching operation, the signals are converted into switching pulses and a high frequency power is supplied to the CL (Xenon lamp) by the transformer.

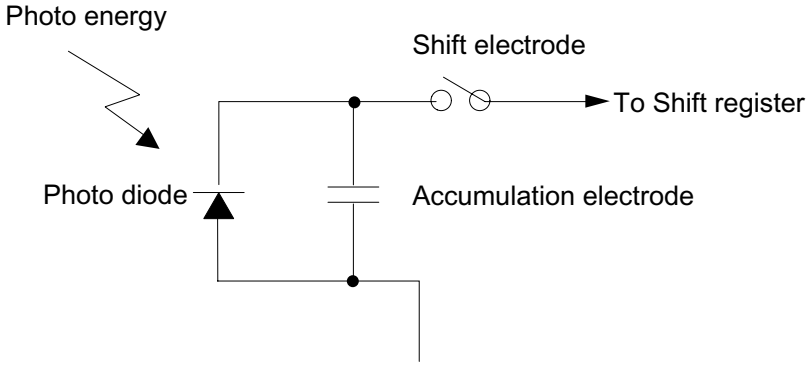
12.CCD PWB operational description

The CCD PWB is provided with the CCD (Charge-Coupled Device), the differential amplifier which amplifies CCD signals, and the AD convertor which converts the amplified signals into digital signals.

The DC power and the pulse supply pins necessary for operating the CCD image sensor are the power source (CD pin), GND (SS pin), shift pulse (SH pin), transfer pulse (ø1 pin), (ø2 pin), reset pulse (/RS pin), clamp pulse (/CP pin), and sampling (/SP pin).
Photo data are stored in the light receiving element at the center of the CCD by the SH signal. Even number pixel data are sent to one of the two shift registers which are positioned at both ends of the light receiving element, and odd number pixel data are sent to the other shift register. The time interval between inputting two SH signals is called the photo accumulation time.
The signals are transfered to the register, then to the shift register sequentially by transfer pulsesø1 and ø2 and to the floating capacitor section where electric signals are voltage-converted. Electric charges from the even number pixel shift register and the odd number pixel shift register are flowed to the floating capacitor section alternatively.



The /RS signal is the reset signal of the CCD output signal. The CCD output is expressed as electric charges equivalently accumulated in the capacitor. Therefore, to take the CCD output data one pixel by one pixel, one output data must be cleared after it is outputted. The /RS signal is used for that operation.The /SP pulse signal is the peak hold signal of the signal voltage.



The output signal from the CCD is amplified by about 4.7 times greater in the differential amplifier circuit in the CCD PWB.
Differential amplification is made for the signal output (OS) and the compensation output (DOS).
The amplified CCD signal output is sent to the clamp circuit. In the clamp circuit, the black level is clamped to 2V at the BCLK signal timing by the analog switch. The clamped voltage is maintained for one line by the coupling capacitor. The clamped analog signal is impedance-converted and inputted to the AD convertor.
The analog signal inputted to the AD convertor is converted into 8bit digital data and passed to the PCU PWB.
The machine employs the TCD1501C as the image sensor. The TCD1501C is the reduction type high sensitivity CCD linear sensor of one-output system. 5000 pixels of 7um x 7um are arranged in line to allow scanning of A3 document at 400dpi (16 lines/mm).

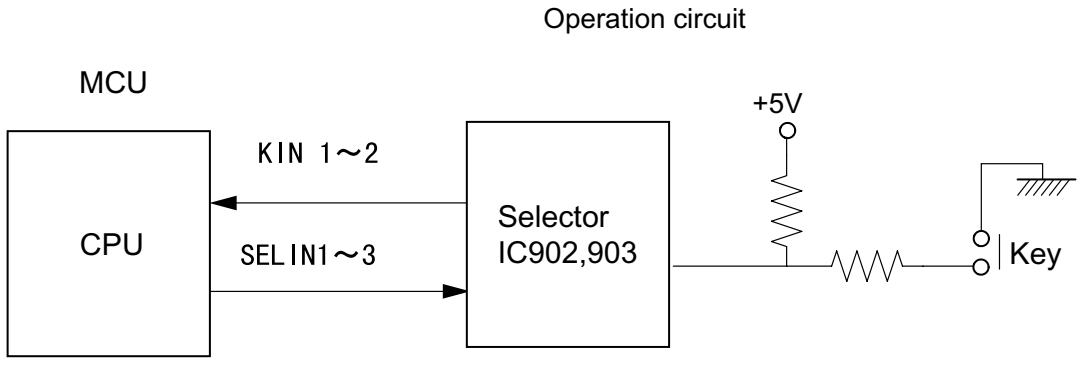
13.Operation section

A. Outline

The operation circuit is composed of the key matrix circuit and the display matrix circuit.

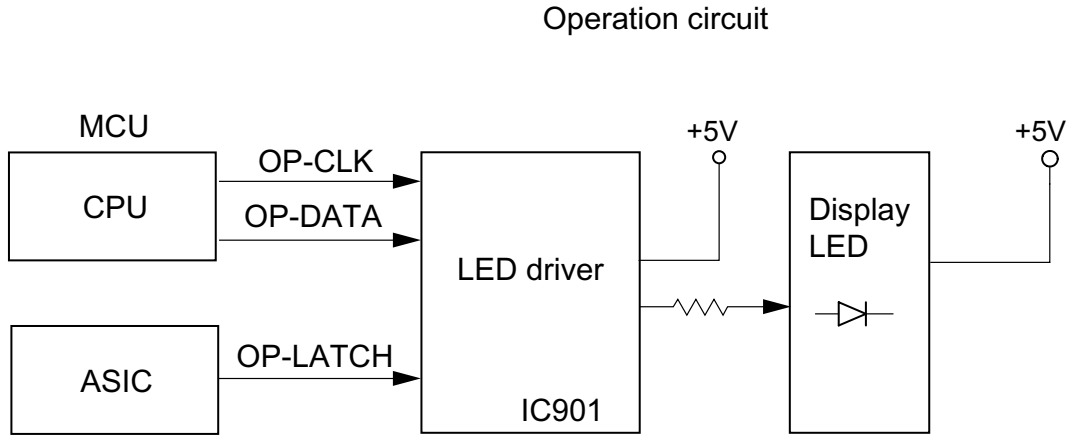
B. Key matrix circuit

The CPU in the MCU sends select signals SELIN1 - 3 to the selector in the operation circuit. The signals detects ON/OFF of the key and are sent to the CPU as KIN1 - 2.

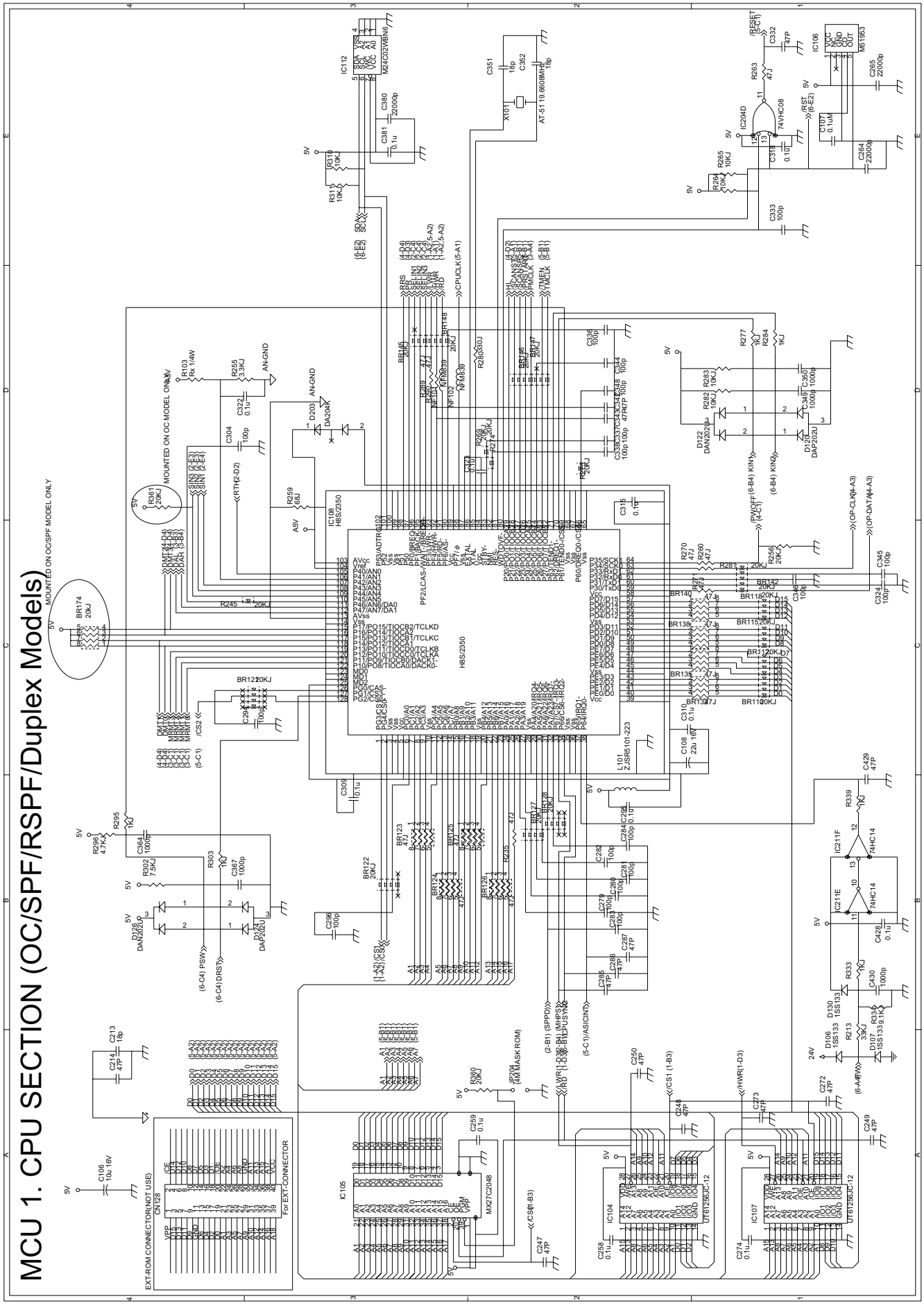


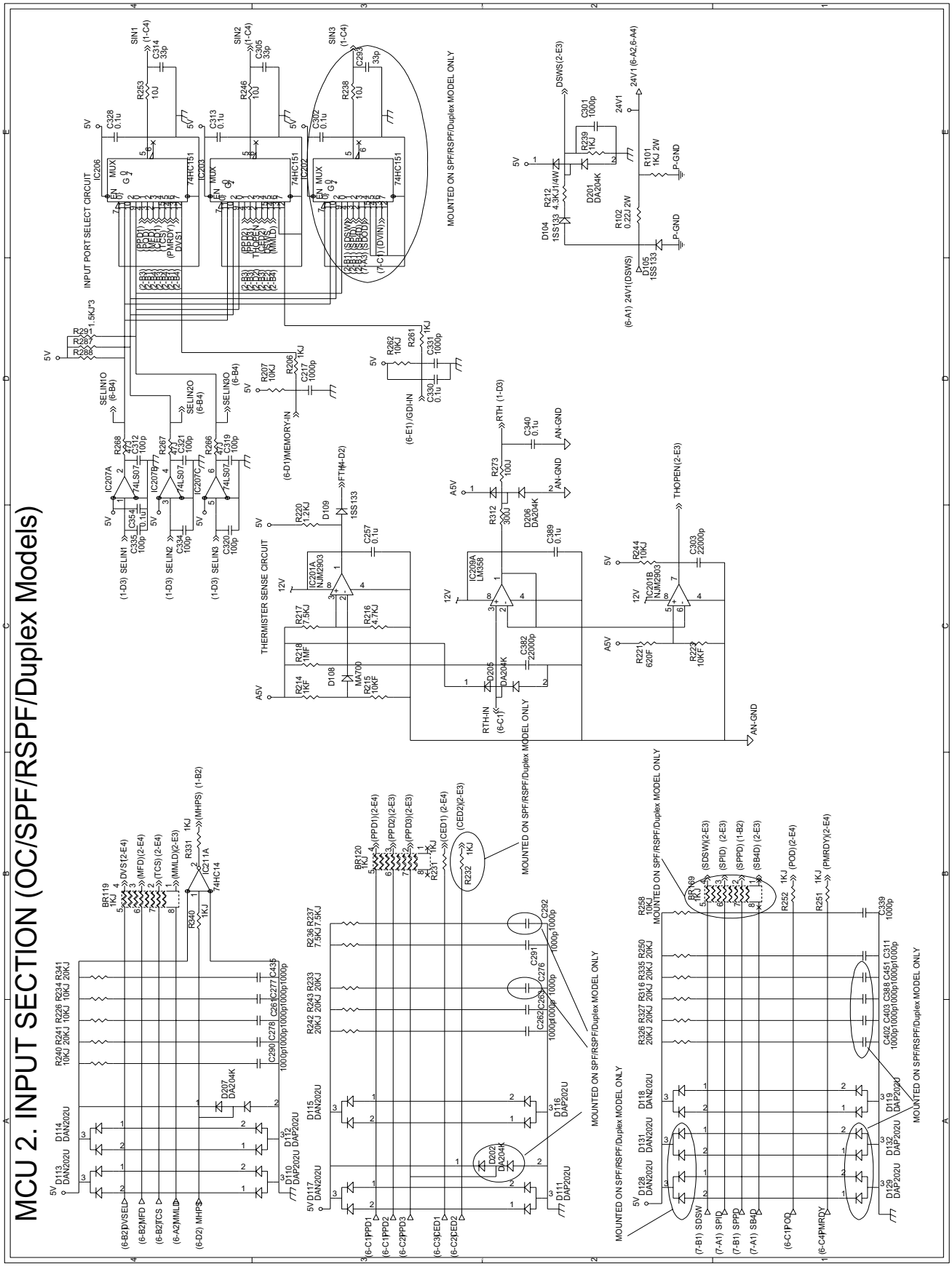
C. Display circuit section

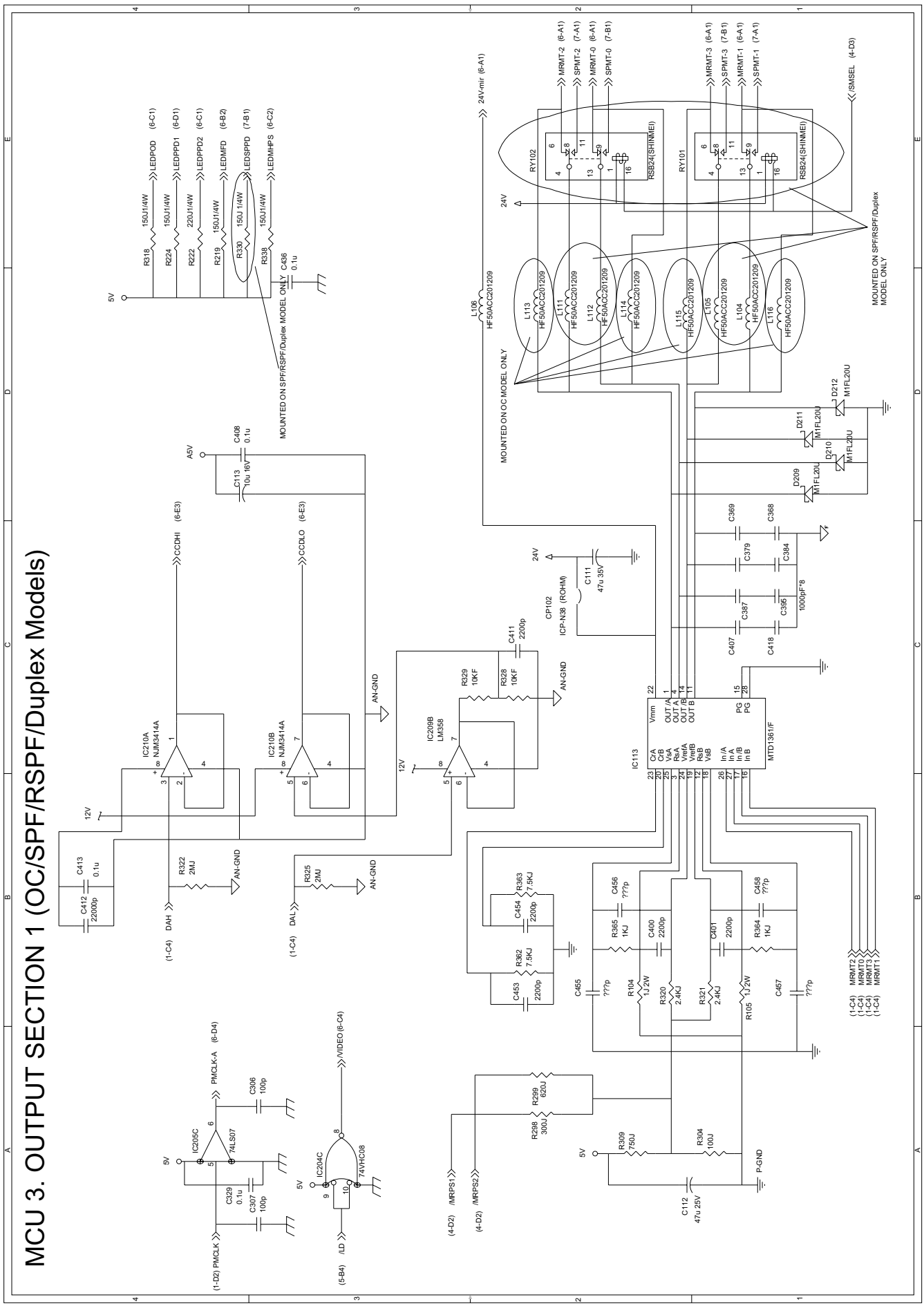
The display is controlled by inputting the data signal and the clock signal from the CPU and the latch signal from the ASIC to the LED driver in the operation circuit.



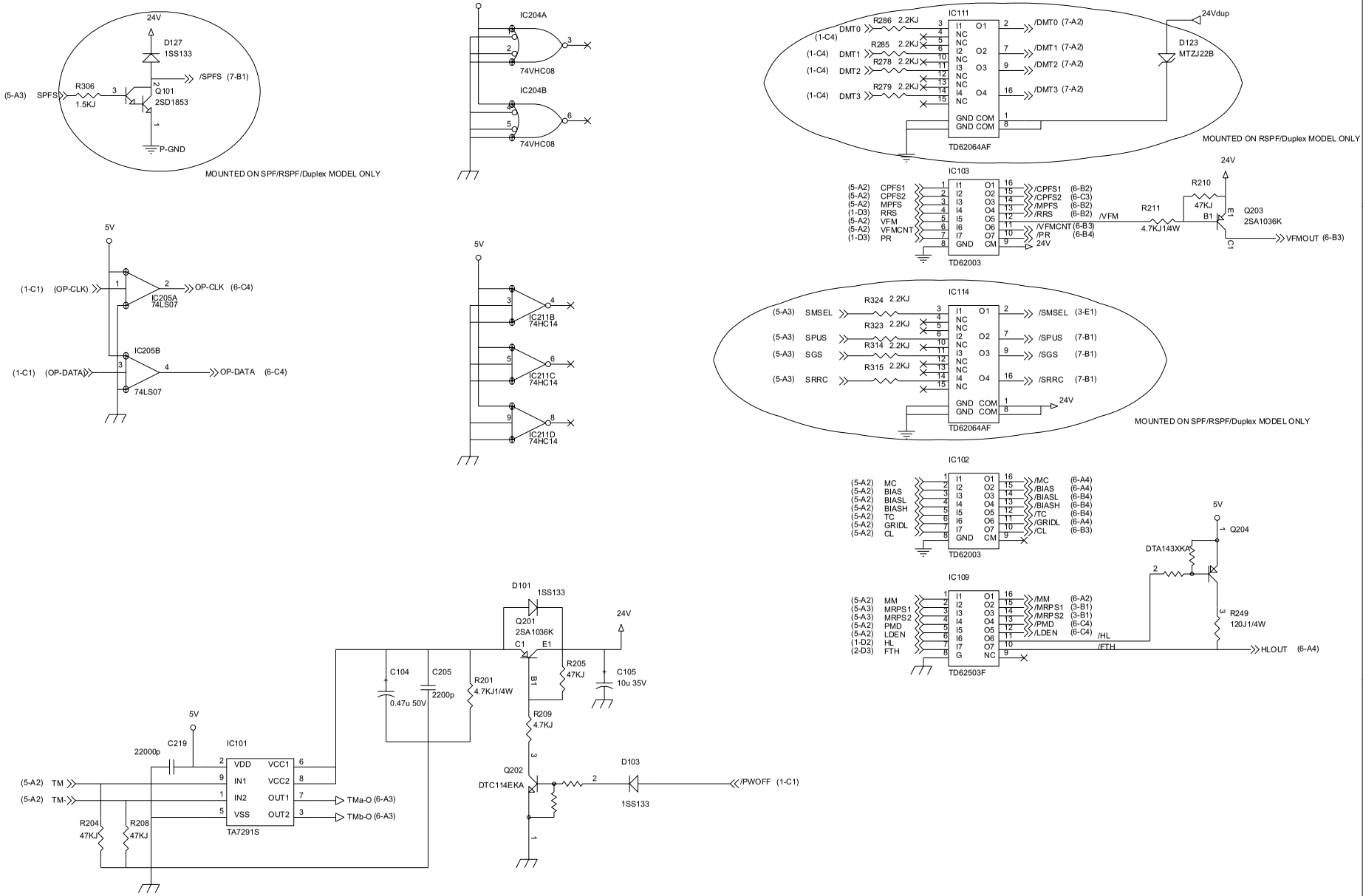
[13]CIRCUIT DIAGRAM

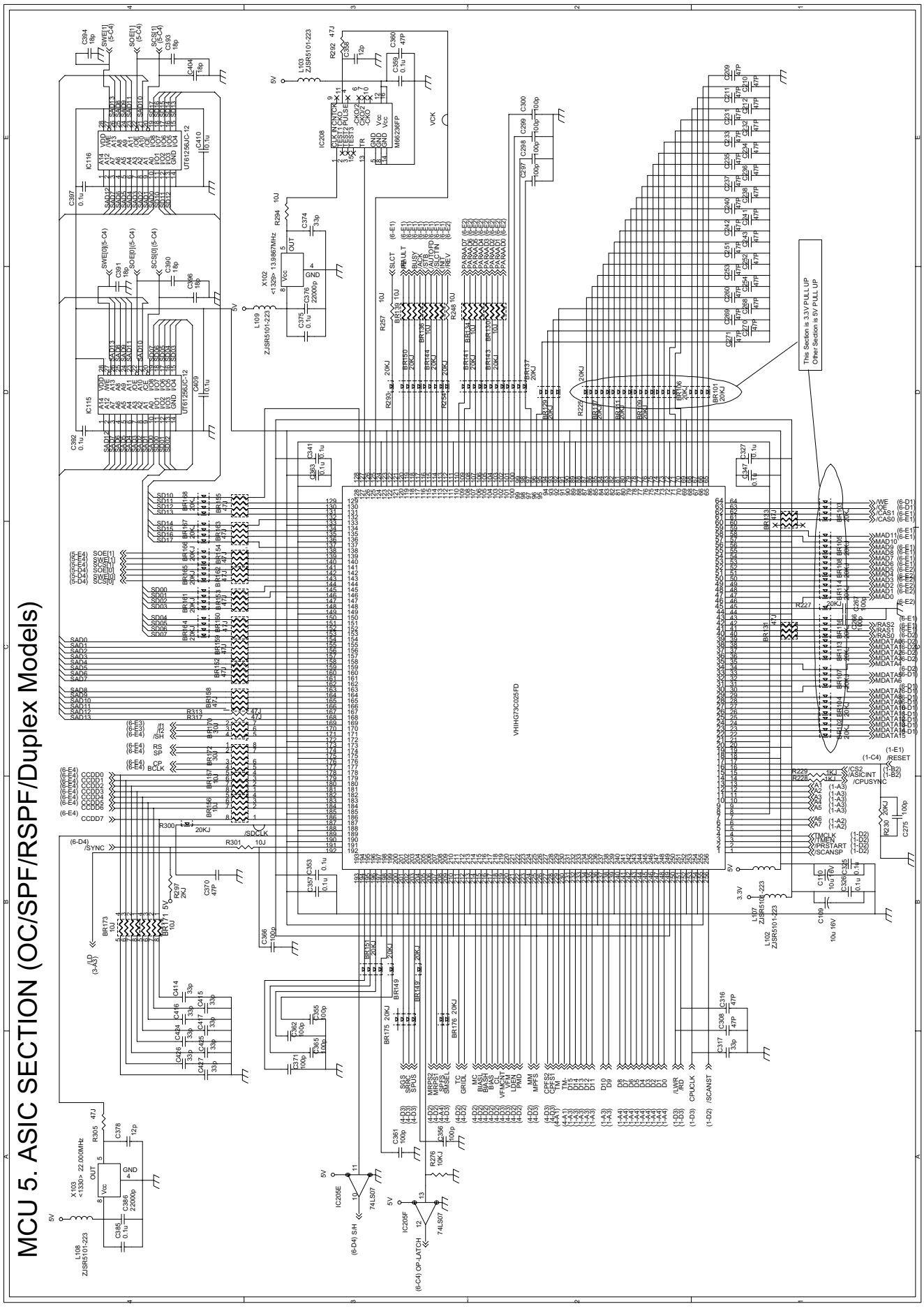



MCU 2. INPUT SECTION (OC/SPF/RSPF/Duplex Models)
INPUT PORT SELECT CIRCUIT
THERMISTER SENSE CIRCUIT
MOUNTED ON SPF/RSPF/Duplex MODEL ONLY

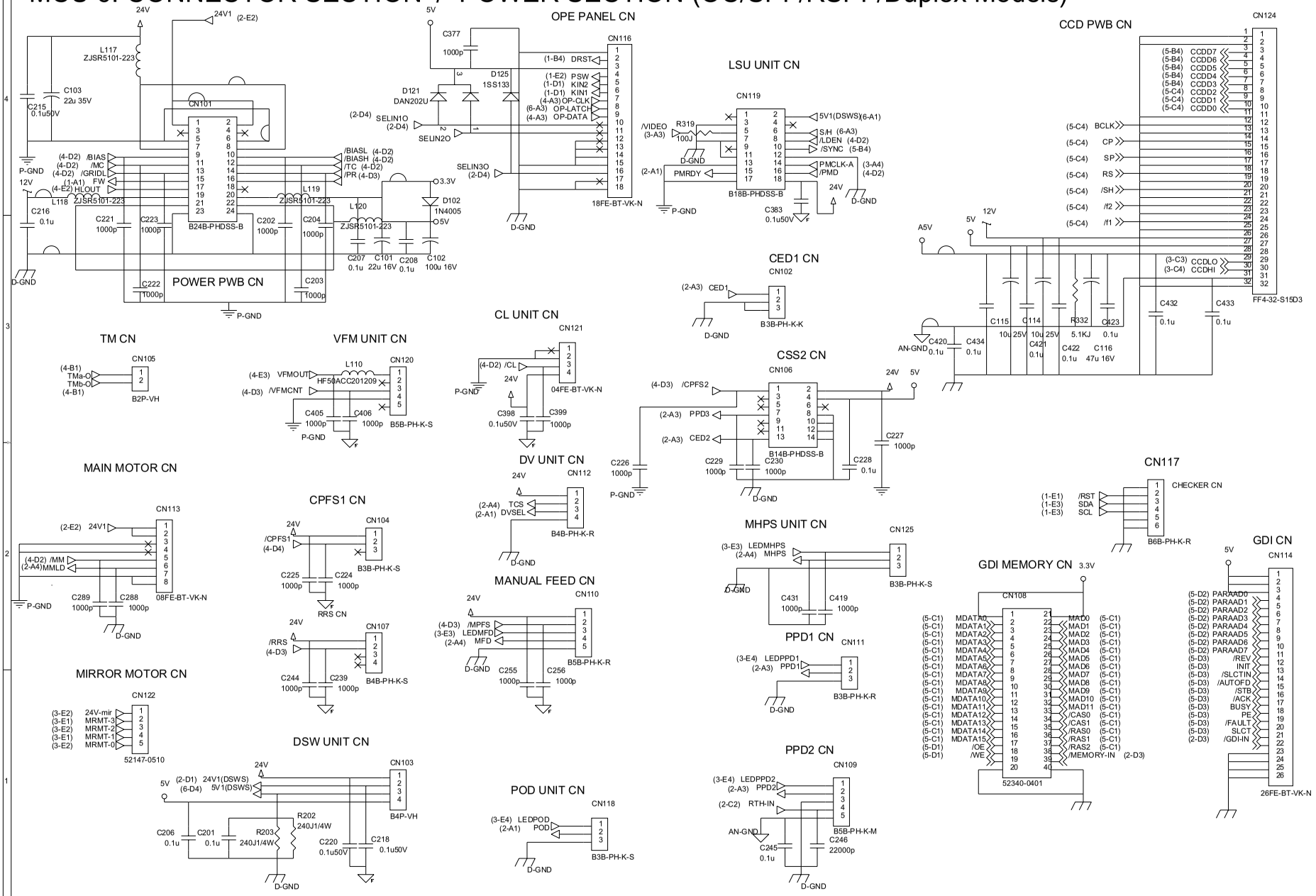

MCU 3. OUTPUT SECTION 1 (OC/SPF/RSPF/Duplex Models)
MOUNTED ON SPF/RSPF/Duplex MODEL ONLY
MOUNTED ON OC MODEL ONLY
MOUNTED ON SPF/RSPF/Duplex MODEL ONLY
IC113
MTD1361/F
IC210A NJM3414A
IC210B NJM3414A
IC209B LM358
IC205C 74LS07
IC204C 74VHC08
RY102
RY101
RSB24(SHINMEI)
CP102 ICP-N38 (ROHM)
CCDHI (6-E3)
CCDLO (6-E3)
DAH (1-C4)
DAL (1-C4)
PMCLK-A (6-D4)
PMCLK (1-D2)
VIDEO (6-C4)
/LD (5-B4)
/MRPS1 (4-D2)
/MRPS2 (4-D2)
MRMT2 (6-A1)
SPMT-2 (7-A1)
MRMT-0 (6-A1)
SPMT-0 (7-B1)
MRMT-3 (6-A1)
SPMT-3 (7-B1)
MRMT-1 (6-A1)
SPMT-1 (7-A1)
/SMSEL (4-D3)
24V-mir (6-A1)
LEDPOD (6-C1)
LEDPPD1 (6-D1)
LEDPPD2 (6-C1)
LEDMFD (6-B2)
LEDSPPD (7-B1)
LEDMHPS (6-C2)
HF50ACC201209
AN-GND
P-GND
A5V
5V
12V
24V

MCU 4. OUTPUT SECTION 2 (OC/SPF/RSPF/Duplex Models)

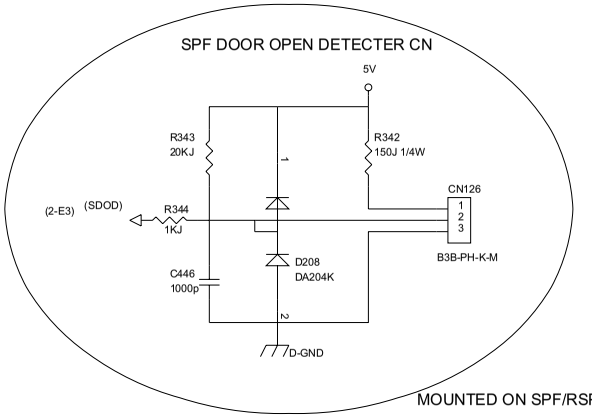



MCU 5. ASIC SECTION (OC/SPF/RSPF/Duplex Models)
VHIHG73C025FD
This Section is 3.3V PULL UP
Other Section is 5V PULL UP

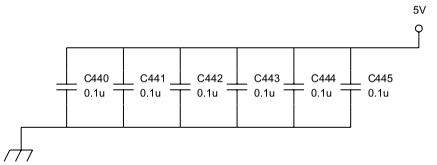
MCU 6. CONNECTOR SECTION / POWER SECTION (OC/SPF/RSPF/Duplex Models)

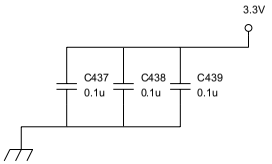


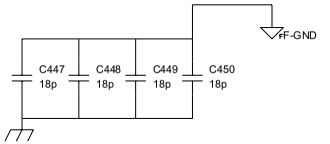
MCU 7. CONNECTOR SECTION 2(OC/SPF/RSPF/Duplex Models)

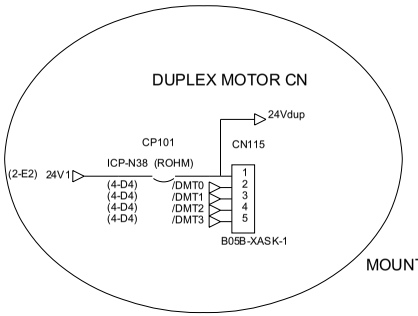


MOUNTED ON SPF/RSPF/Duplex MODEL ONLY

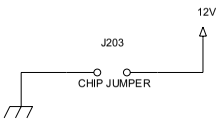


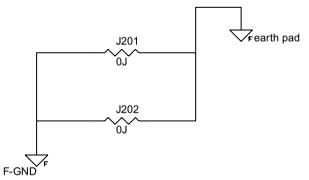


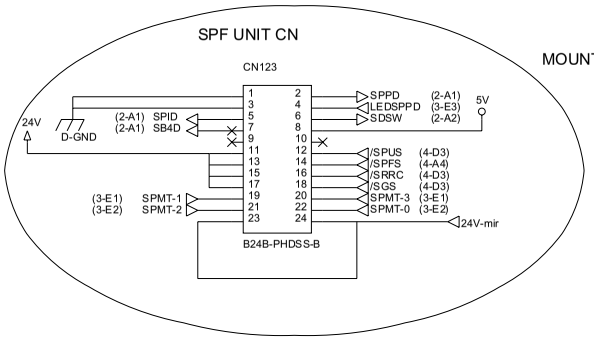




MOUNTED ON RSPF/Duplex MODEL ONLY

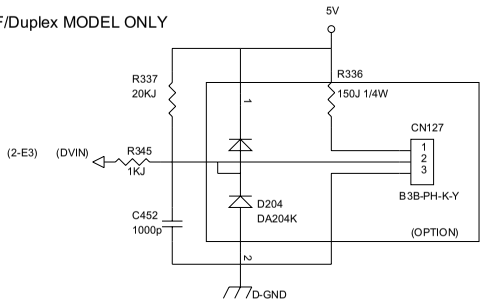




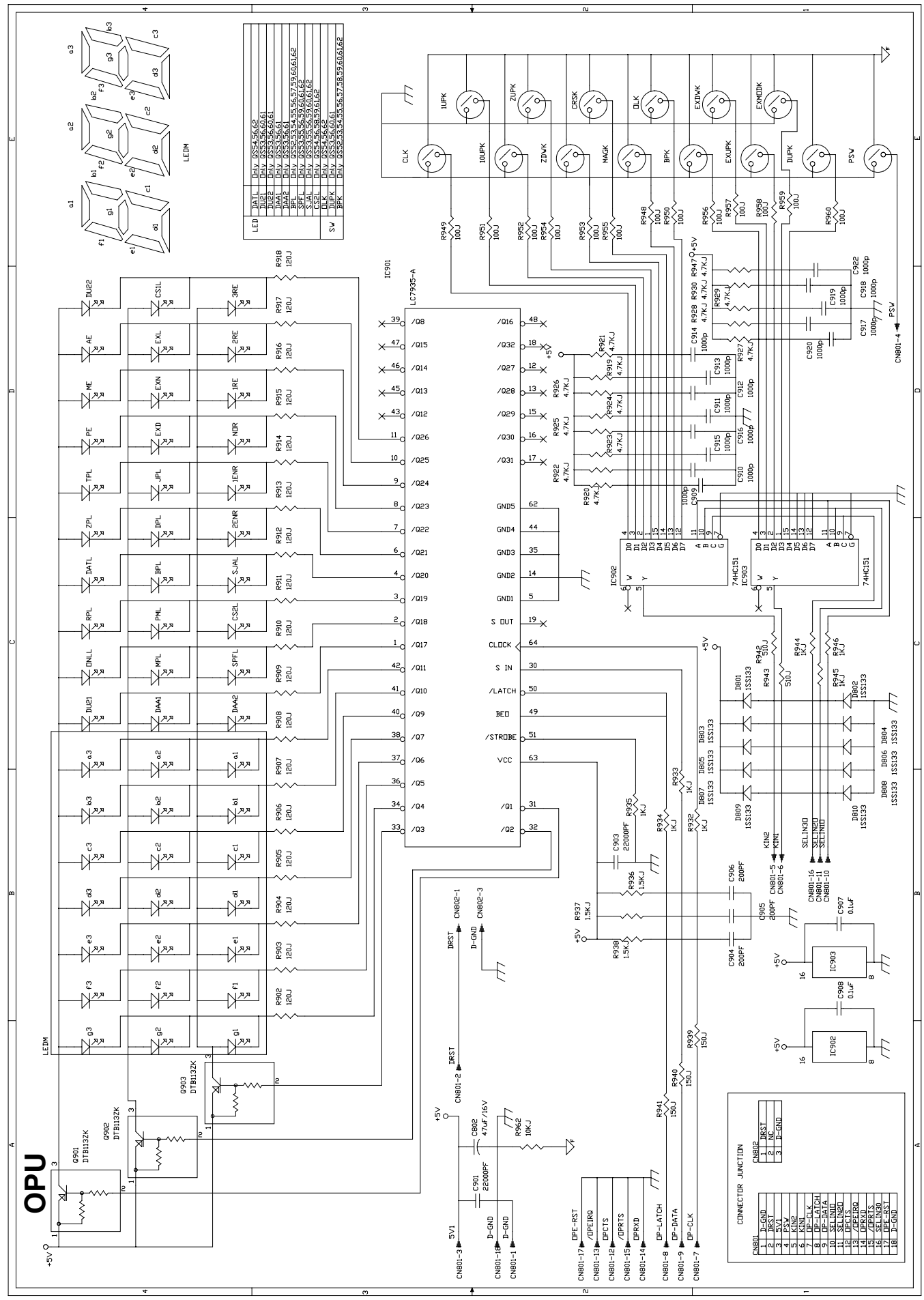


MOUNTED ON SPF/RSPF/Duplex MODEL ONLY

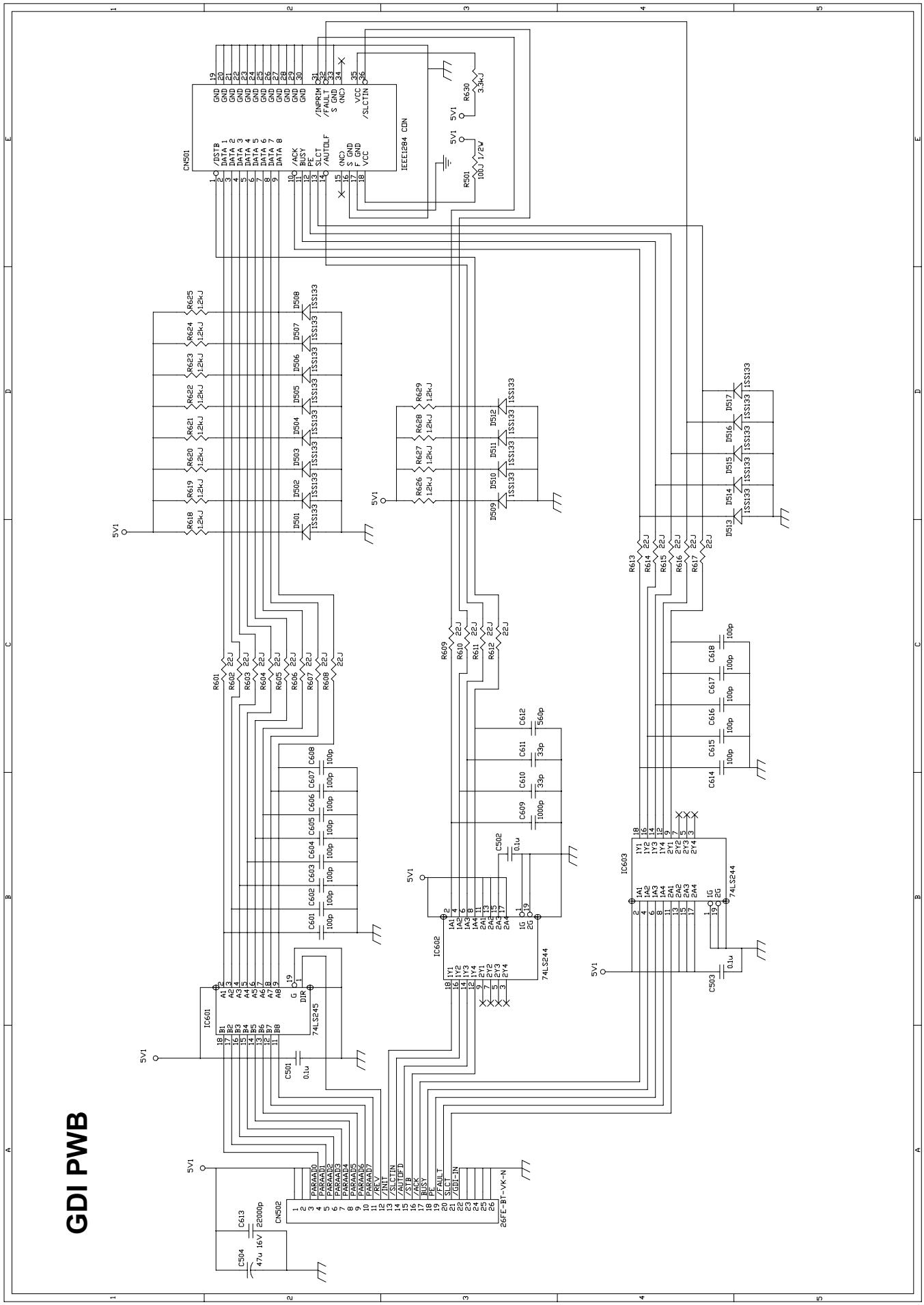
DV UNIT INITIAL DETECTER CN



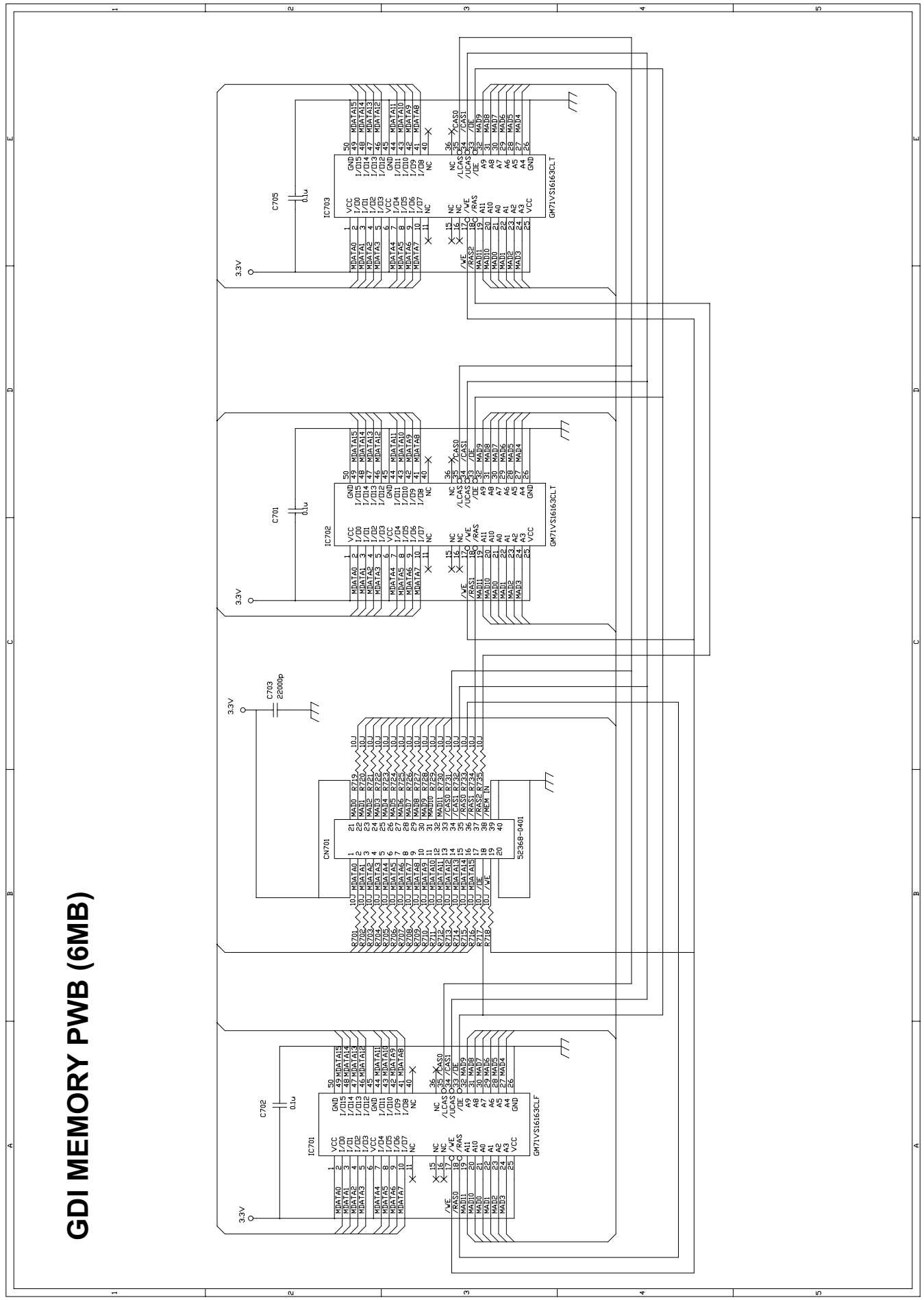
AL-1551 CIRCUIT DIAGRAM 13-7

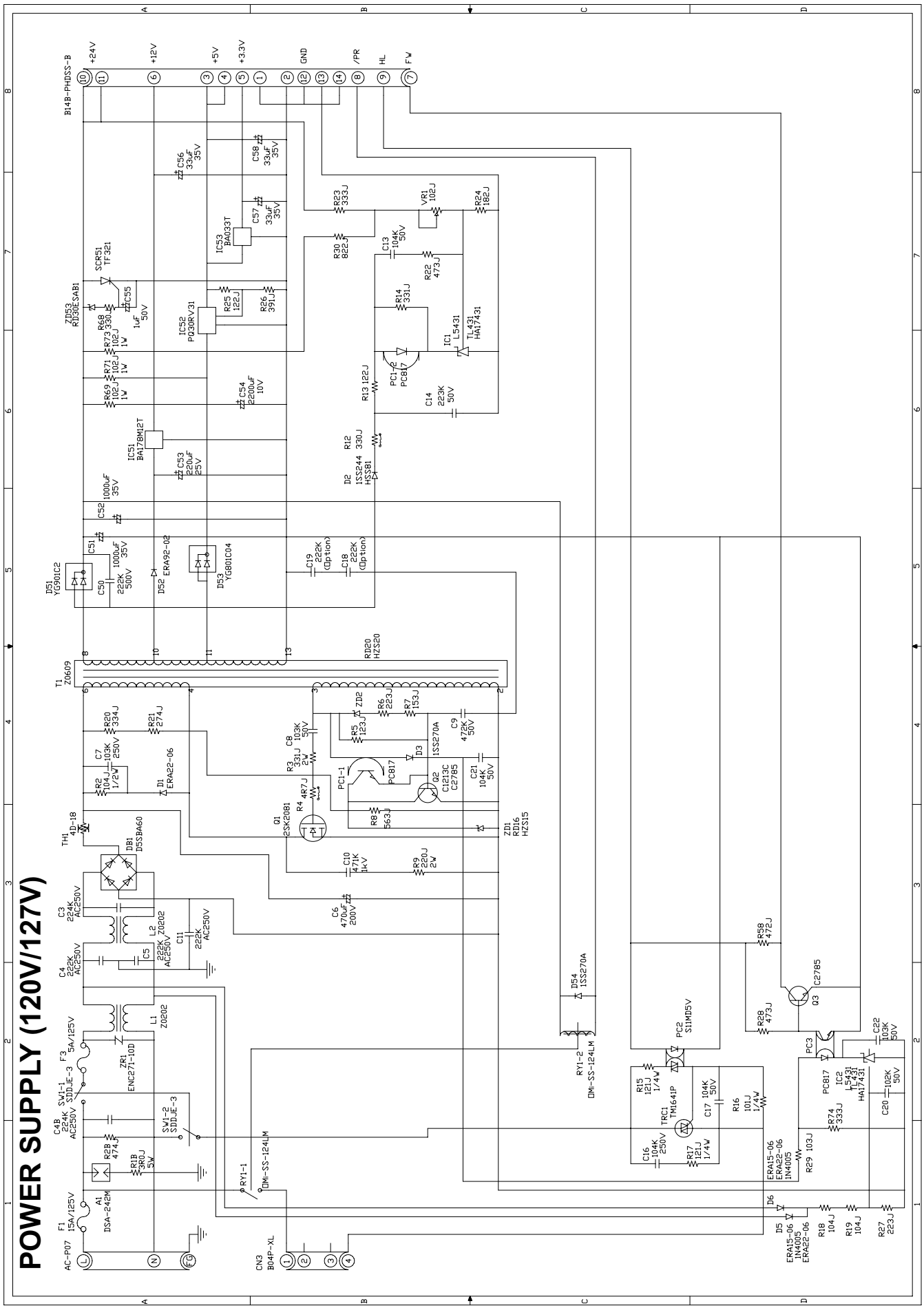


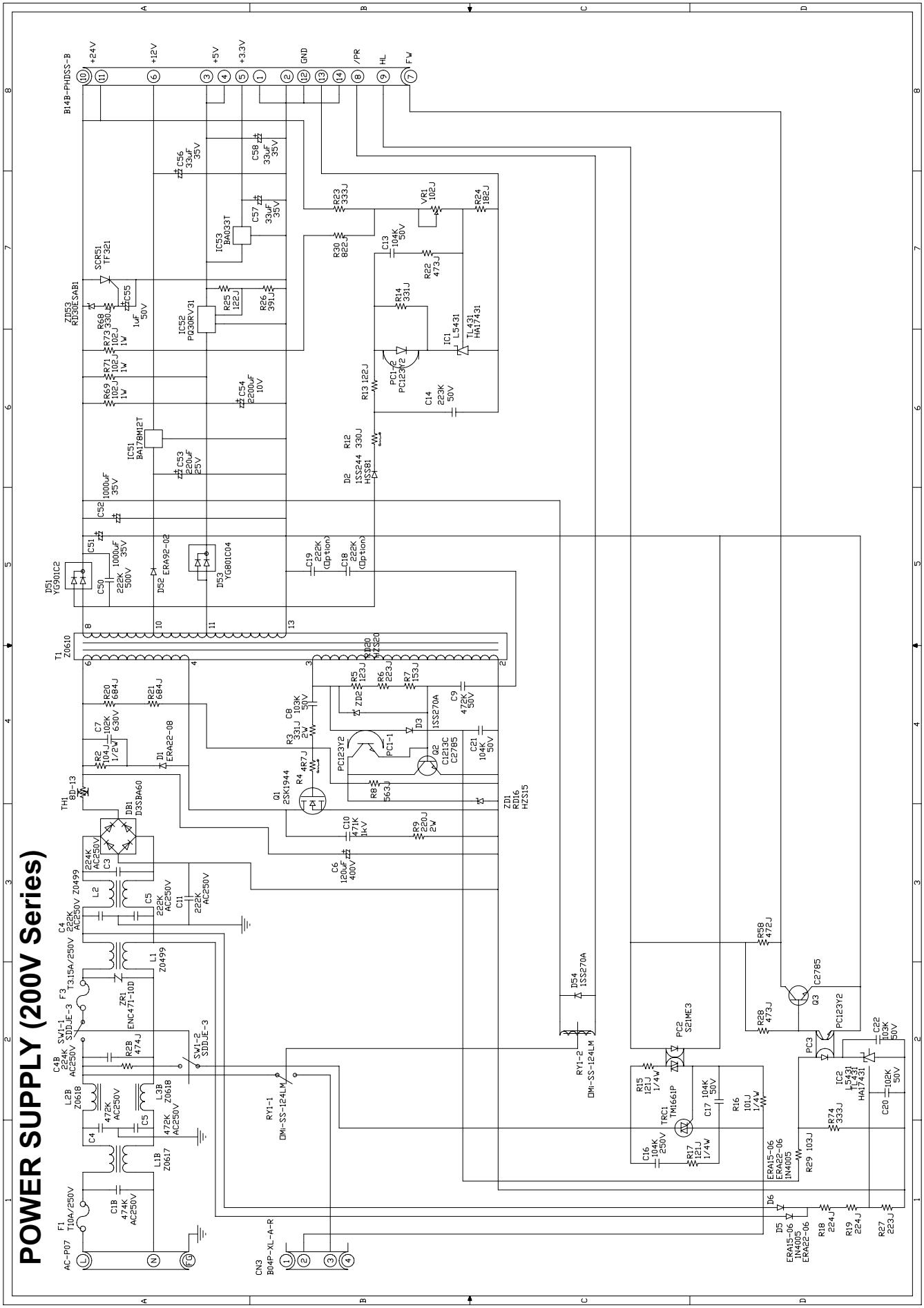
AL-1551 CIRCUIT DIAGRAM 13-8


GDI PWB

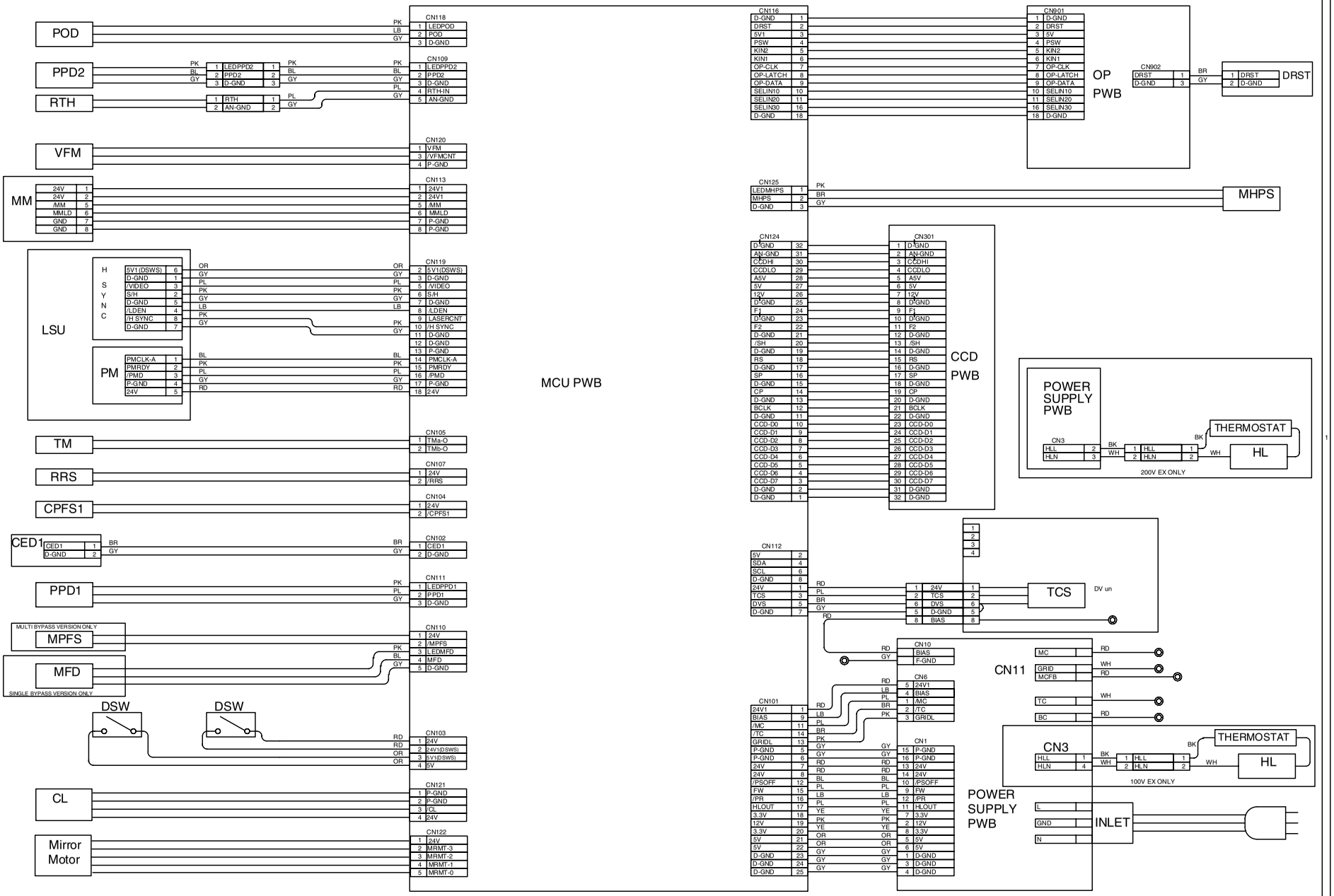
GDI MEMORY PWB (6MB)




POWER SUPPLY (120V/127V)
B14B-PHDSS-B
+24V
+12V
+5V
+3.3V
GND
/PR
HL
FW
AC-P07
CN3 B04P-XL
F1 15A/125V
A1 DSA-242M
F3 5A/125V
SW1-1 SDDJE-3
SW1-2 SDDJE-3
RY1-1 DMI-SS-124LM
RY1-2 DMI-SS-124LM
ZR1 ENC271-10D
L1 Z0202
L2 Z0202
T1 Z0609
TH1 4D-18
DB1 D5SBA60
D1 ERA22-06
D2 1SS244 HSS81
D3 1SS270A
D51 YG901C2
D52 ERA92-02
D53 YG801C04
D54 1SS270A
ZD1 RD16 HZS15
ZD2 RD20 HZS20
Q1 2SK2081
Q2 C1213C C2785
Q3 C2785
PC1-1 PC817
PC1-2 PC817
PC2 S1MD05V
PC3 PC817
IC1 L5431 TL431 HA17431
IC2 L5431 TL431 HA17431
IC51 BA178M12T
IC52 P030RV31
IC53 BA033T
SCR51 TF321
TRC1 TM1641P
ZD53 RD30ESAB1
D5 ERA15-06 IN4005 ERA22-06
D6 ERA15-06 ERA22-06 IN4005
C1 104K 50V
C2 222K AC250V
C3 224K AC250V
C4 222K AC250V
C4B 224K AC250V
C5 222K AC250V
C6 470uF 200V
C7 103K 250V
C8 103K 50V
C9 472K 50V
C10 471K 1kV
C11 222K AC250V
C13 104K 50V
C14 223K 50V
C16 104K 250V
C17 104K 50V
C18 222K (Option)
C19 222K (Option)
C20 102K 50V
C21 104K 50V
C22 103K 50V
C50 222K 500V
C51 1000uF 35V
C52 1000uF 35V
C53 220uF 25V
C54 2200uF 10V
C55 1uF 50V
C56 33uF 35V
C57 33uF 35V
C58 33uF 35V
R1B 3R0J 5W
R2 104J 1/2W
R2B 474J
R3 331J 2W
R4 4R7J
R5 123J
R6 223J
R7 153J
R8 563J
R9 220J 2W
R12 330J
R13 122J
R14 331J
R15 121J 1/4W
R16 101J 1/4W
R17 121J 1/4W
R18 104J
R19 104J
R20 334J
R21 274J
R22 473J
R23 333J
R24 182J
R25 122J
R26 391J
R27 223J
R28 473J
R29 103J
R30 822J
R58 472J
R68 330J
R69 102J 1W
R71 102J 1W
R73 102J 1W
R74 333J
VR1 102J


POWER SUPPLY (200V Series)
B14B-PHDSS-B
+24V
+12V
+5V
+3.3V
GND
/PR
HL
FW
AC-P07
CN3
B04P-XL-A-R
T1
Z0610
IC1
L5431
IC2
L5431
IC51
BA178M12T
IC52
PQ30RV31
IC53
BA033T
SCR51
TF321
PC1
PC123Y2
PC2
S21ME3
PC3
TRC1
TM1661P
Q1
2SK1944
Q2
C1213C
C2785
Q3
C2785
D1
ERA22-08
D2
1SS244
HSS81
D3
1SS270A
D51
YG901C2
D52
ERA92-02
D53
YG801C04
D54
1SS270A
D5
ERA15-06
1N4005
ERA22-06
D6
ERA15-06
ERA22-06
1N4005
DB1
D3SBA60
ZD1
RD16
HZS15
ZD2
ZD53
RD30ESAB1
TH1
8D-13
F1
T10A/250V
F3
T3.15A/250V
SW1-1
SIDJE-3
SW1-2
SIDJE-3
RY1-1
DMI-SS-124LM
RY1-2
DMI-SS-124LM
ZR1
ENC471-10D
L1
Z0499
L2
Z0499
L1B
Z0617
L2B
Z0618
L3B
Z0618
C1B
474K
AC250V
C3
224K
AC250V
C4
222K
AC250V
C4B
224K
AC250V
C5
222K
AC250V
C6
120uF
400V
C7
102K
630V
C8
103K
50V
C9
472K
50V
C10
471K
1kV
C11
222K
AC250V
C13
104K
50V
C14
223K
50V
C16
104K
250V
C17
104K
50V
C18
222K
(Option)
C19
222K
(Option)
C20
102K
50V
C21
104K
50V
C22
103K
50V
C50
222K
500V
C51
1000uF
35V
C52
1000uF
35V
C53
220uF
25V
C54
2200uF
10V
C55
1uF
50V
C56
33uF
35V
C57
33uF
35V
C58
33uF
35V
R2
104J
1/2W
R2B
474J
R3
331J
2W
R4
4R7J
R5
123J
R6
223J
R7
153J
R8
563J
R9
220J
2W
R12
330J
R13
122J
R14
331J
R15
121J
1/4W
R16
101J
1/4W
R17
121J
1/4W
R18
224J
R19
224J
R20
684J
R21
684J
R22
473J
R23
333J
R24
182J
R25
122J
R26
391J
R27
223J
R28
473J
R29
103J
R30
822J
R68
330
R69
102J
1W
R71
102J
1W
R73
102J
1W
R74
333J
VR1
102J

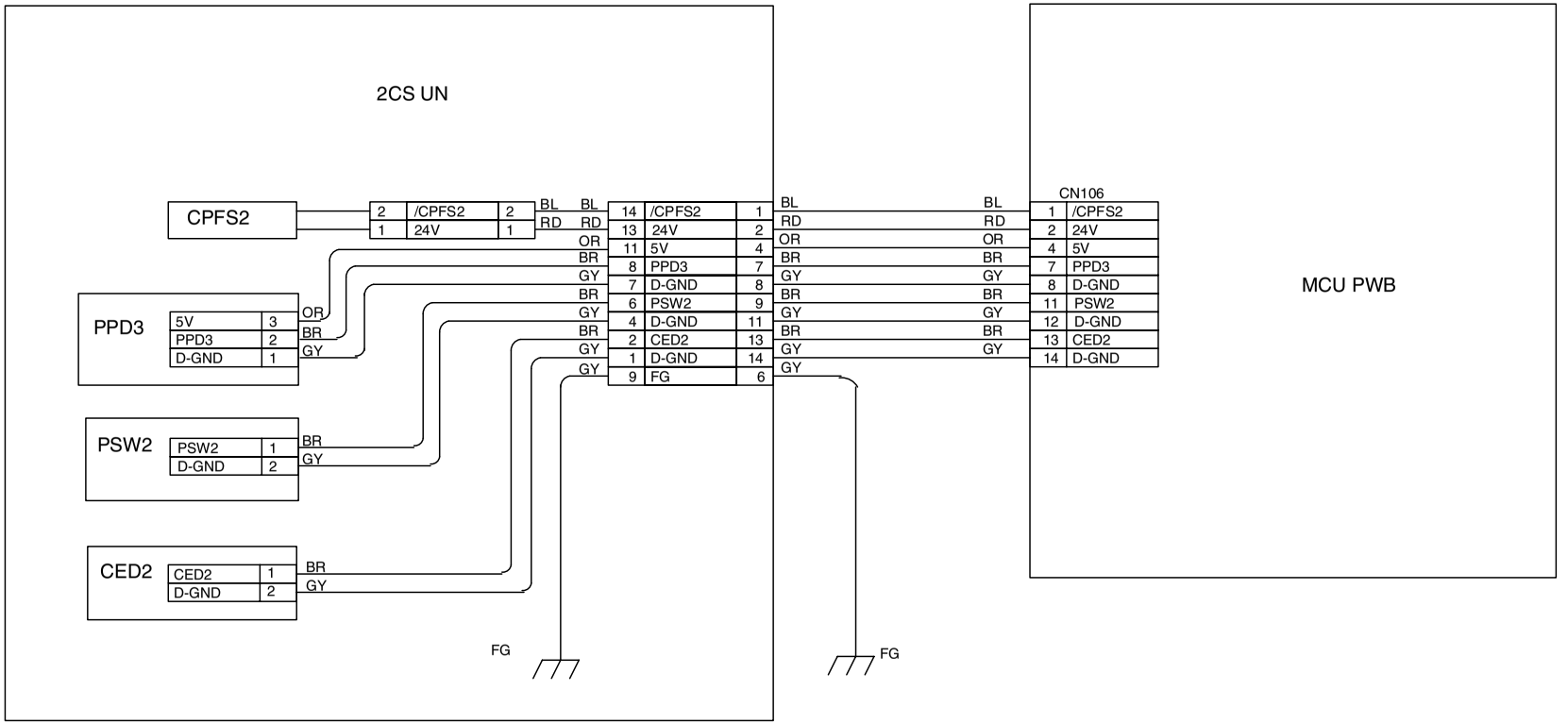
ACTUAL WIRING DIAGRAM 1/5



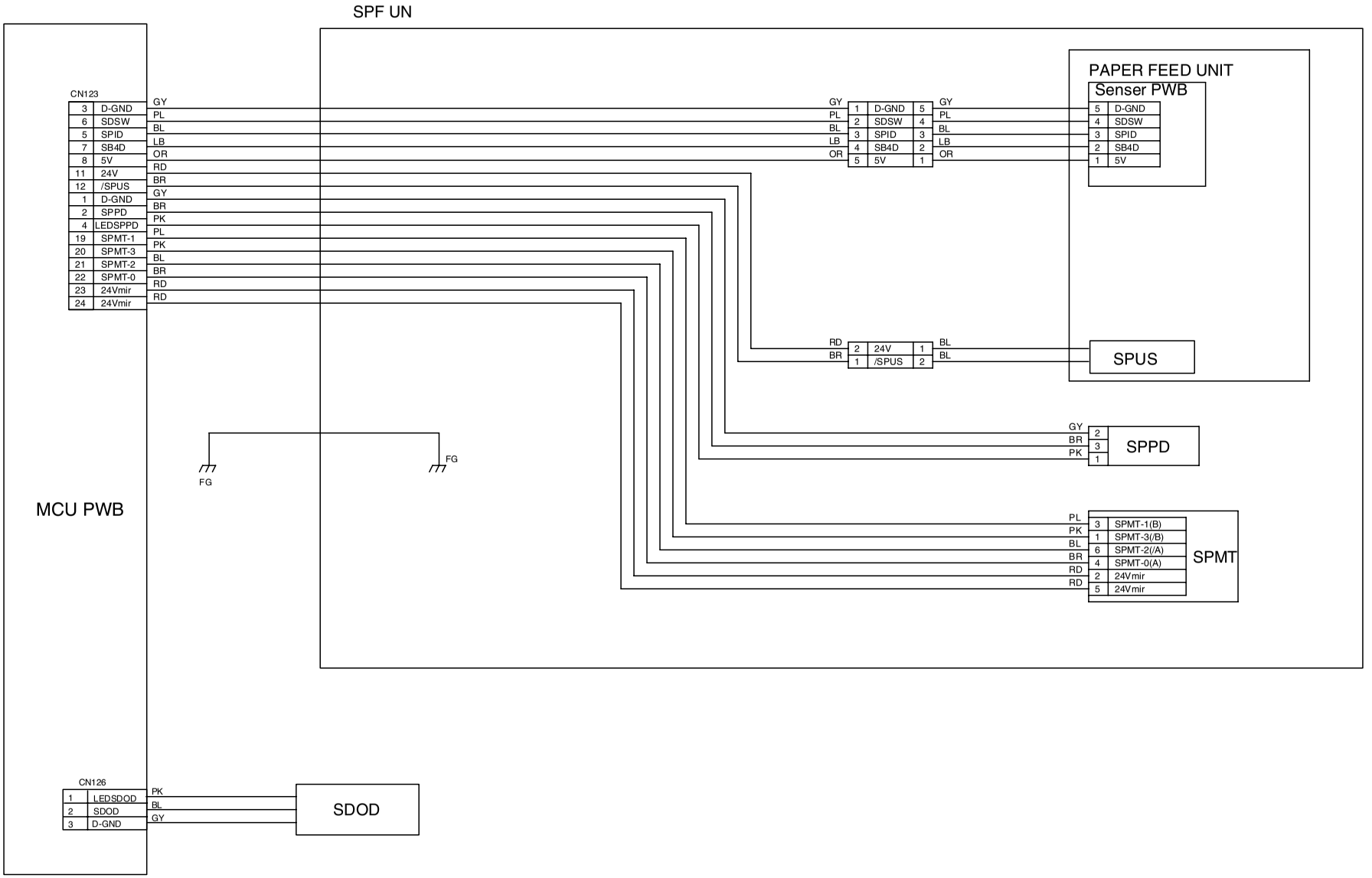
AL-1551 CIRCUIT DIAGRAM 13-13

ACTUAL WIRING DIAGRAM 2/5 (GDI)

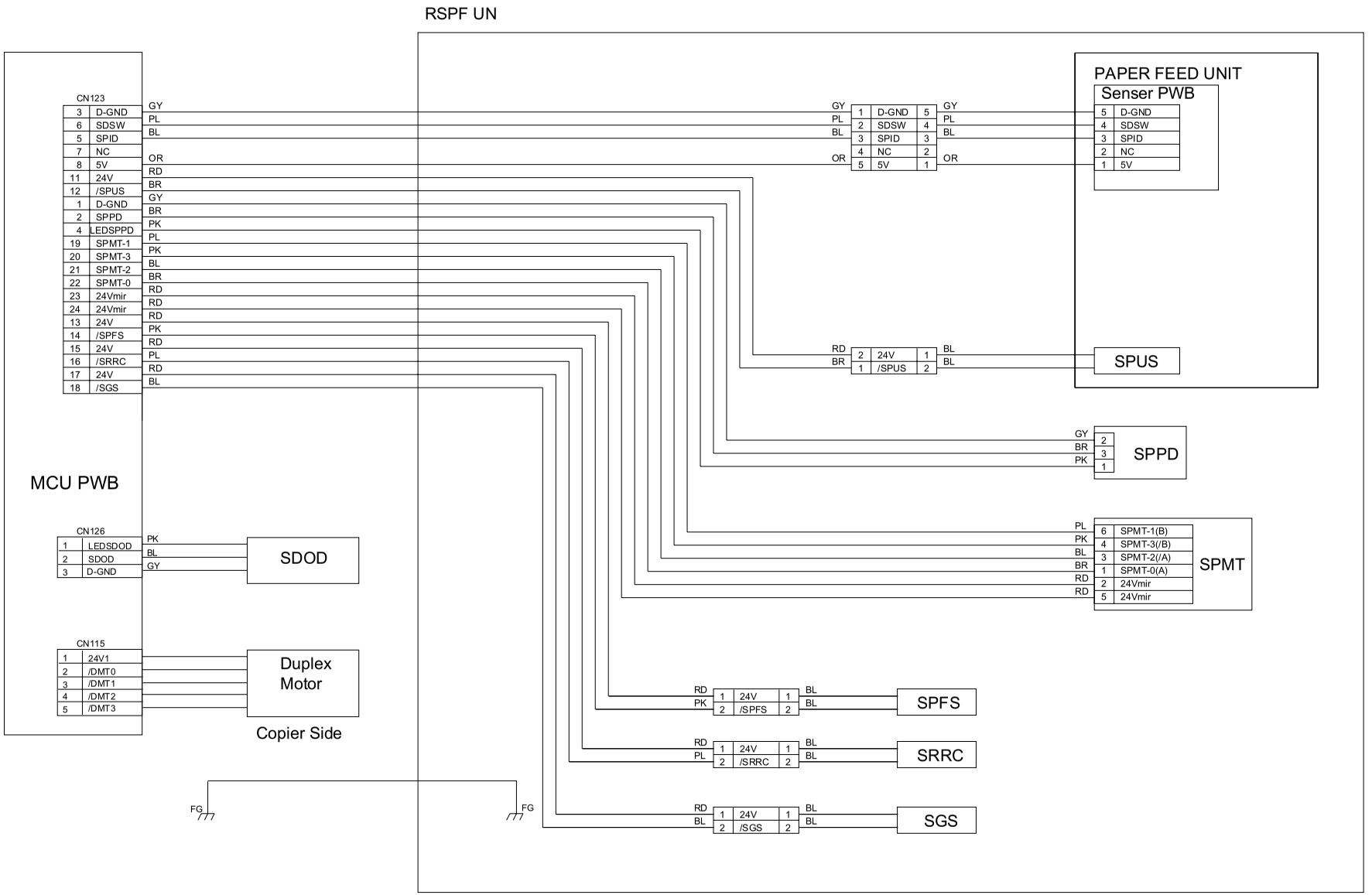
ACTUAL WIRING DIAGRAM 3/5 (2nd cassette)



ACTUAL WIRING DIAGRAM 4/5 (SPF)



ACTUAL WIRING DIAGRAM 5/5 (RSPF , Duplex)



CAUTION FOR BATTERY REPLACEMENT

(Danish) ADVARSEL !

Lithiumbatteri – Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri
af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandoren.

(English) Caution !

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type
recommended by the manufacturer.
Dispose of used batteries according to manufacturer's instructions.

(Finnish) VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan
tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden
mukaisesti.

(French) ATTENTION

Il y a danger d'explosion s' il y a remplacement incorrect
de la batterie. Remplacer uniquement avec une batterie du
même type ou d'un type équivalent recommandé par
le constructeur.
Mettre au rebut les batteries usagées conformément aux
instructions du fabricant.

(Swedish) VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en ekvivalent
typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt fabrikantens
instruktion.

(German) Achtung

Explosionsgefahr bei Verwendung inkorrekter Batterien.
Als Ersatzbatterien dürfen nur Batterien vom gleichen Typ oder
vom Hersteller empfohlene Batterien verwendet werden.
Entsorgung der gebrauchten Batterien nur nach den vom
Hersteller angegebenen Anweisungen.

CAUTION FOR BATTERY DISPOSAL

(For USA,CANADA)

Contains lithium-ion battery. Must be disposed of properly.
Remove the battery from the product and contact
federal or state environmental
agencies for information on recycling and disposal options.

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